JOURNAL
OF THE
AMERICAN VETERINARY MEDICAL ASSOCIATION

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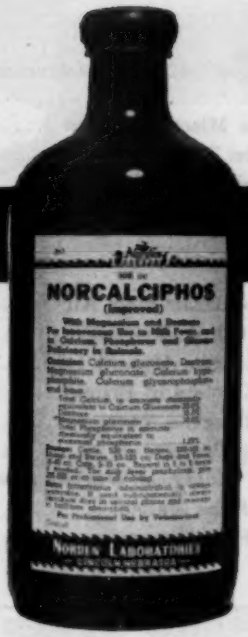

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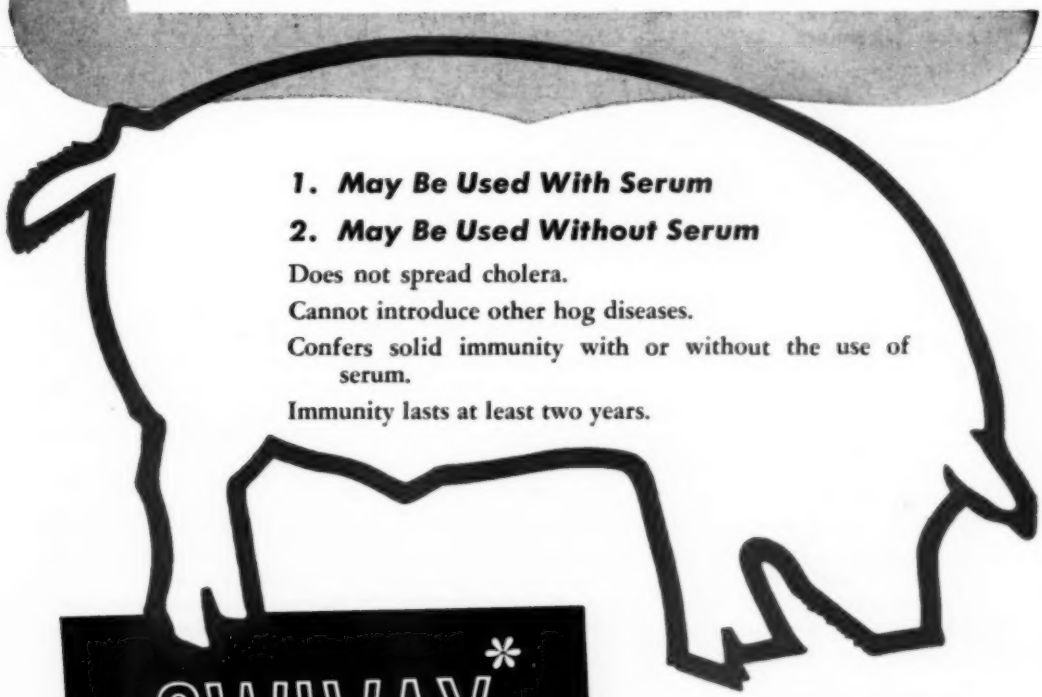

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AVMA ☆ Report

Veterinary Medical Activities

✤ The AVMA panel exhibit, which portrays the functions of veterinarians for lay audiences, will be shown March 2-5 at the Rhode Island Farm and Home Show, Providence, by the Rhode Island Veterinary Medical Association.

★ ★ ★

✤ Assistant Executive Secretary H. E. Kingman, Jr., attended the annual meeting of Livestock Conservation, Inc., held in Chicago, Feb. 18, 1954.

★ ★ ★

✤ President J. A. McCallam spoke to the Minnesota student chapter of the AVMA while attending the annual meeting of the Minnesota Veterinary Medical Association in St. Paul, February 10-12.

★ ★ ★

✤ President J. A. McCallam appeared on the programs of the annual meetings of the Illinois V. M. A., Chicago, Feb. 10-12, 1954, and the Arkansas V. M. A., Little Rock, February 21-23.

★ ★ ★

✤ President-Elect A. H. Quin spoke at the annual meeting of the Wisconsin V. M. A., in Milwaukee on February 4-6, and at the annual meeting of the Missouri V. M. A., in Jefferson City on February 22-23.

★ ★ ★

✤ President J. A. McCallam, Executive Secretary J. G. Hardenbergh, and Assistant Executive Secretary H. E. Kingman, Jr., attended a conference of the "health professions" in Washington, D.C., on February 4. The conference was sponsored by the American Pharmaceutical Association for the purpose of developing an interprofessional code of ethics with regard to the distribution and channeling of drugs to the ultimate consumer.

★ ★ ★

✤ The Board of Governors (Executive Board Chairman Edwin Laitinen, President J. A. McCallam, and President-Elect A. H. Quin) met at Association headquarters, Feb. 8 and 9, 1954.

★ ★ ★

✤ The 1953 "Proceedings Book" was placed in the mails early in February. It is hoped all members have received and had an opportunity to read their copy.

★ ★ ★

✤ During February, President J. A. McCallam appointed two new committees to give attention to special problems confronting the veterinary profession. The AVMA Special Committee on Veterinary Supply Problems has been established to consider, survey, and evaluate the many elements relating to the effect of sales, dispensing, and merchandising of veterinary biological and pharmaceutical products and supplies. President McCallam has asked Dr. F. B. Young of Iowa to serve as chairman and Drs. Rolland Anderson (Wisconsin), Ray Klussendorf (Indiana), Harry Geyer (Ohio), P. E. Madsen (Wyoming), Kenneth Whittington (Tennessee), and Joseph M. Arburua (California) to serve as members.

The second committee appointed is designated as AVMA Special Committee on Graduates of Foreign Veterinary Colleges and is established to survey, study, and make recommendations designated to improve orientation and integration of displaced veterinarians from foreign veterinary schools into the professional life of the United States and Canada. President McCallam has asked Dr. John D. Gadd of Maryland to serve as chairman and Col. Wm. E. Jennings (Texas), Drs. C. F. Clark (Michigan), F. Kral (Pennsylvania), Ernest Froelich (New York), and T. Lloyd Jones (Ontario) to serve as members.

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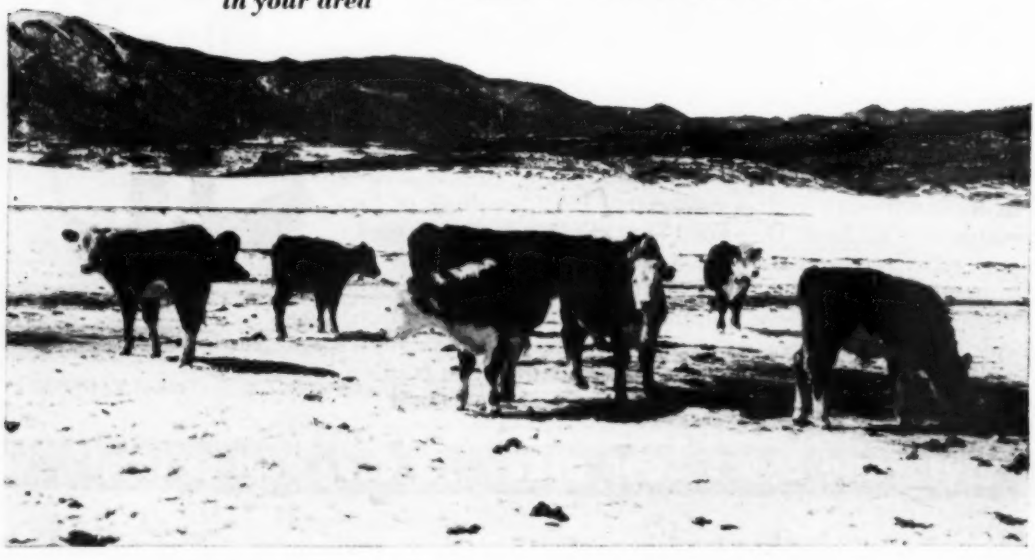

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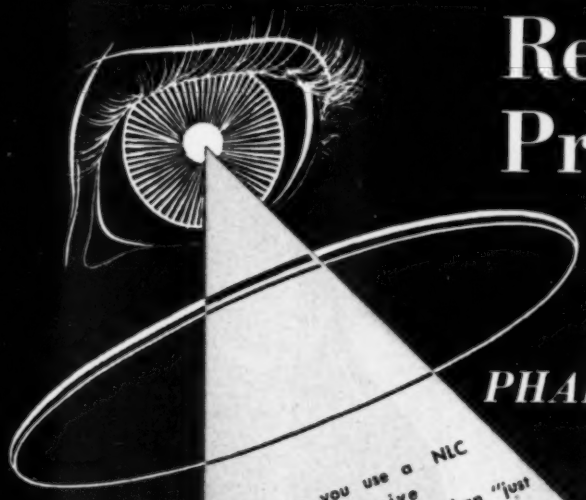

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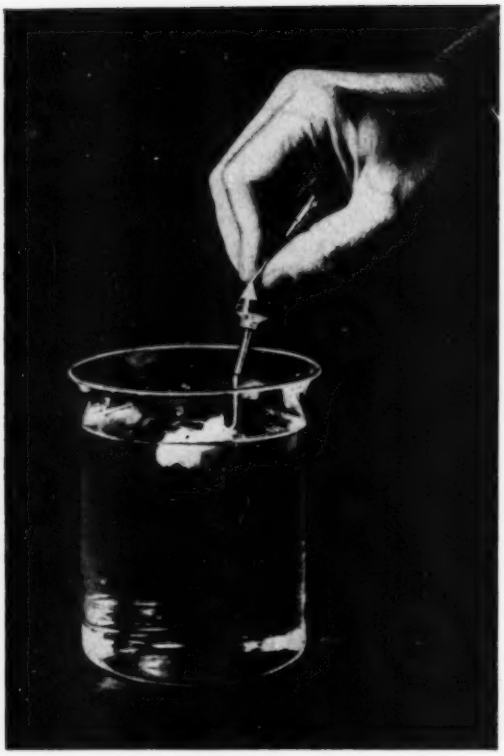

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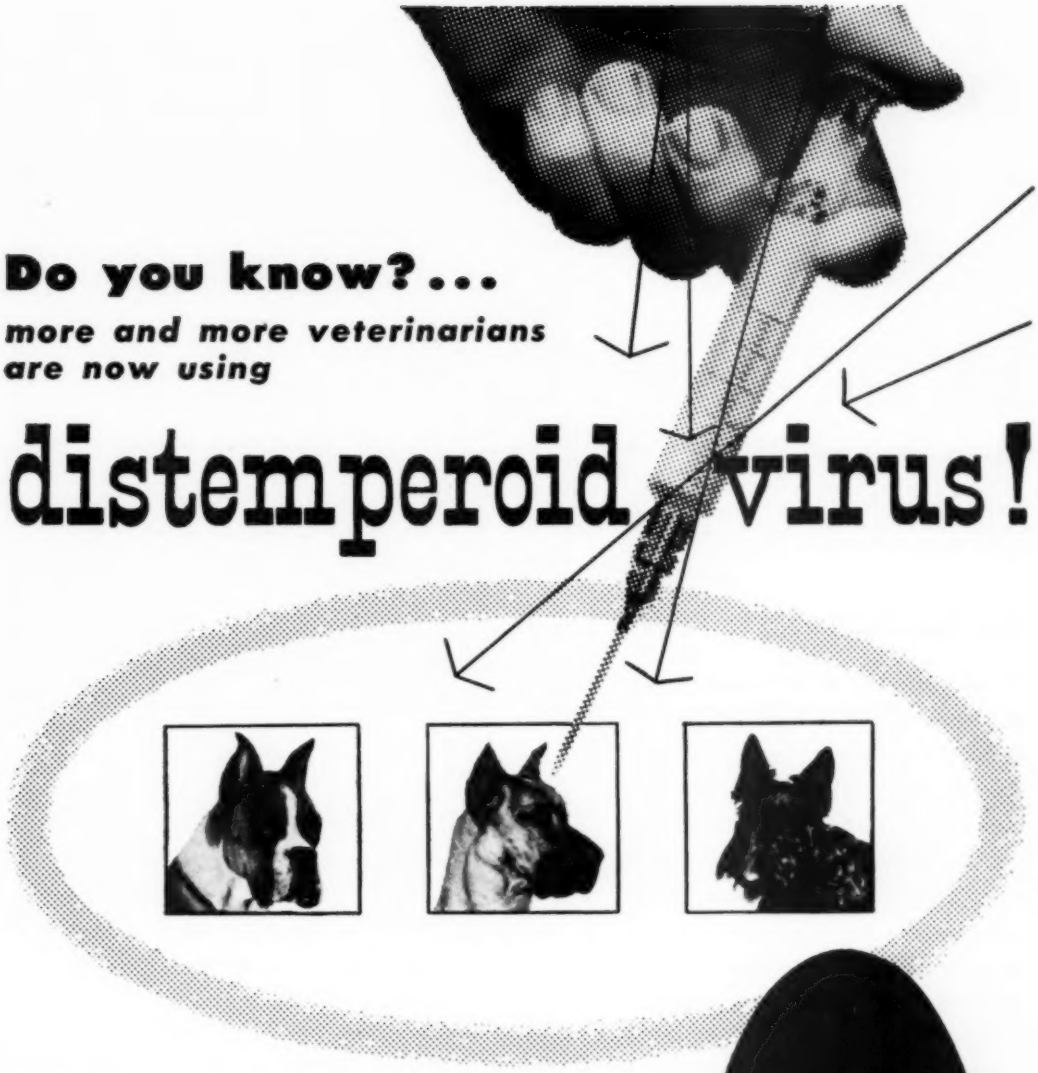

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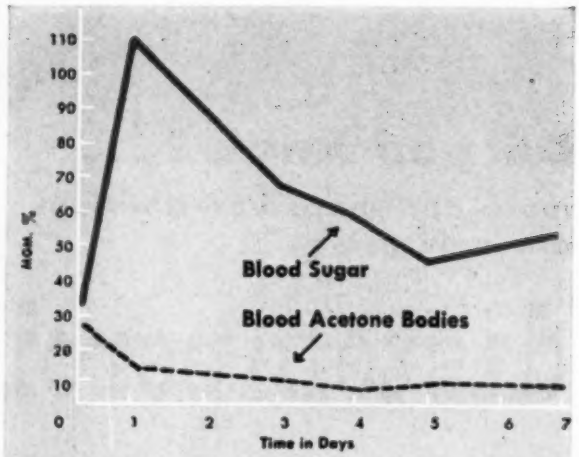

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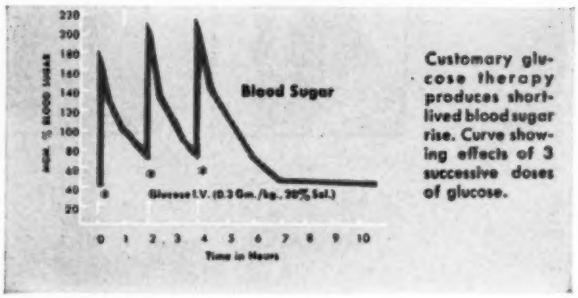

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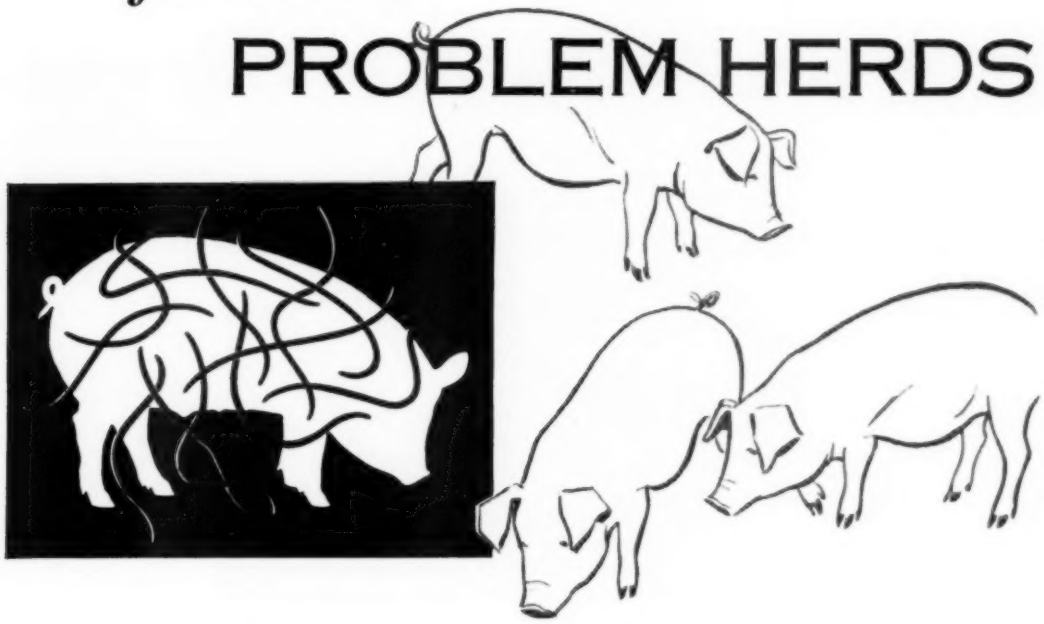

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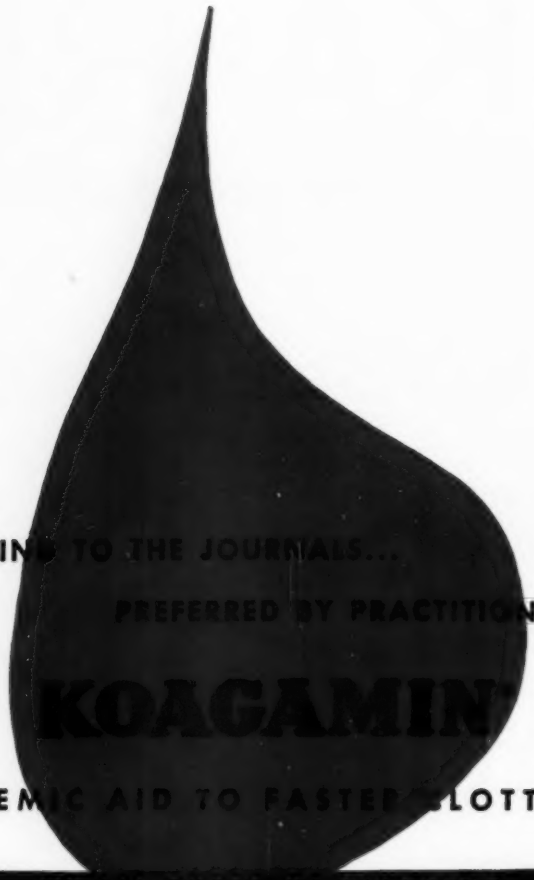

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(1) Whitney, G. D.: J. Am. Vet. M. A. *122*:21, 1953.
(2) Blamey, E. R.: J. Am. Vet. M. A. *119*:291, 1951.
(3) Klausman, B. S., Brown, H. W.: Vet. Med. *47*:235, '52.
(4) Scott, M. L.: Vet. Med. *48*:95, 1953.
(5) Klausman, B. S.: Vet. Med. *46*:282, 1951.

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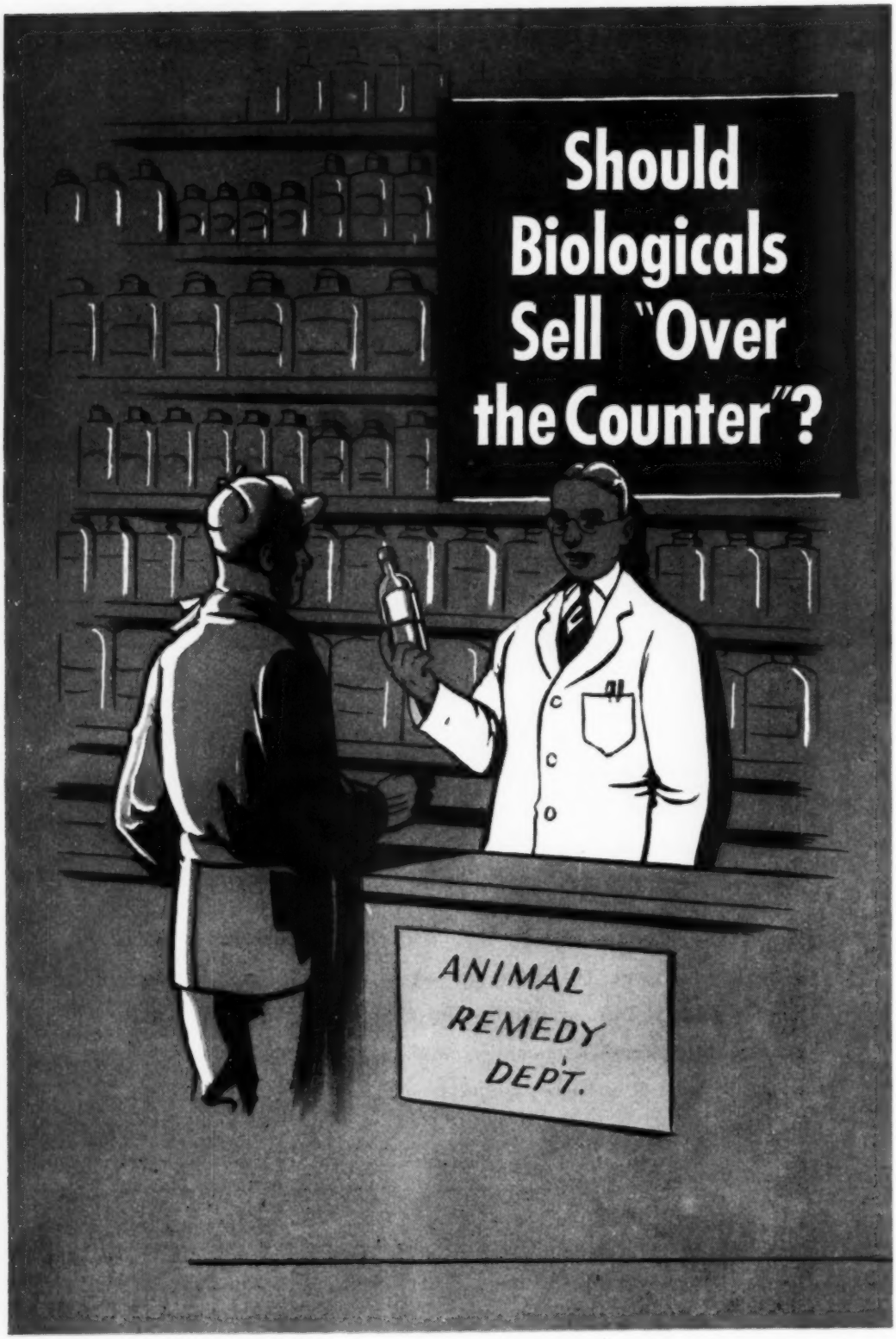
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1. Pratt, R.; Dufrenoy, J., and Strait, L. A., J. Bact., 55:75, 1948.

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VOL. 124 MARCH, 1954 No. 924

Observations on Rabies with Special Reference to Colorado

GEORGE W. STILES, M.D., Ph.D.

Denver, Colorado

RABIES IS defined as an acute, infectious disease of the central nervous system, caused by a neurotrophic type of filterable virus. Essentially, it involves the canine species, domestic or wild, but other animals are frequently affected.

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The rabies virus generally is present in the saliva of rabid animals, and consequently the bite of such animals is the source of infection. The virus has been demonstrated in the saliva of dogs seven days prior to onset of symptoms. Open wounds, abrasions, or injured tissues, including abnormal mucous membranes of the eyes or mouth, are avenues of infection on direct contact with rabies virus. Bites on the face, neck, and head are considered the most dangerous, although the number of bites and their depth are equally important.

Rabies is one of the most ancient animal maladies known to mankind, having been recognized more than 3,000 years ago. In the fourth century B.C., Aristotle stated "Dogs suffer from madness which puts them in a state of fury, and all animals which they bite when in this condition become also attacked with madness." Prior to the eighteenth century, however, rabies was primarily a disease of wild animals, and dogs were not an important factor in maintaining or spreading the malady. Rabies was recognized in England, in 1613, but did not assume epizoötic proportions until 1734.

The first recorded outbreak of rabies among dogs occurred in Italy during 1708. A few years later, the disease spread to major cities in Hungary, Germany, and France. Rabies now is common in Russia, Spain, Africa, Japan, China, and is present to a lesser extent in other European and Asiatic countries. Due to effective quarantine measures, the disease seldom gains a foothold in England, Holland, or Switzerland, and Australia and Hawaii are reportedly entirely free.

There is no evidence that rabies existed in North or South America prior to colonization. Historical archives of the State of Virginia reported rabies in 1753; in North Carolina in 1762; and throughout New England in 1770. The disease has now spread to virtually every area of the United States.

Under ordinary circumstances, the incidence of rabies, in a given area, is directly proportional to the canine population. In sparsely settled districts, however, the disease may be rare in dogs or domestic animals. Large, densely populated areas are often free for years. Infection in wildlife is increasing in some sections of the United States, particularly among foxes.

RABIES IN THE ROCKY MOUNTAIN AREA*

Rabies in wild animals and man has been recognized in the Rocky Mountain Region for more than one hundred years. DeVoto[6] describes an outbreak of hydrophobia caused by a mad wolf among the Indians and fur traders in 1833. Axtell[2] diagnosed the disease clinically, in Colorado, in an 8-year-old boy bitten severely by a stray dog on the upper lip Nov. 2, 1898. The patient died in great agony twenty-three days afterward.

A Colorado State Board of Health report for 1900 lists 2 human cases of rabies in that year. During 1917, 9 persons, bitten by a mad stray dog, were given antirabies vaccine and none developed the disease. Another person, who did not receive vaccine therapy, died from rabies. For the years 1922 through 1933, some 350 rabies examinations, unclassified as to species and results, are recorded. State vital statistics records for Colorado show 5 deaths from rabies in man during 1923

Dr. Stiles is special research consultant, State of Colorado Department of Public Health, and was formerly chief of the Laboratories Section.

*The author has prepared a more detailed history of rabies in the Rocky Mountain Area which has been submitted to the Rocky Mountain Medical Journal for publication.

to 1933. In 1927, more than 100 positive cases of rabies were diagnosed, including a brindle Bulldog known to have bitten 60 head of dairy cattle. One herd of 20 cows was virtually exterminated. No human deaths from rabies in this state were reported from 1934 through 1944.

RABIES IN ANIMALS

The superstitious belief that rabies is largely associated with "dog days" during July and August is without foundation. In fact, statistics indicate that slightly more rabies cases occur in late winter and early spring than during the warmer seasons. Due to hot weather, normal dogs often become cross because of thirst or other causes and may even be suspected of being "mad dogs."

Incubation Period.—All warm-blooded animals are susceptible to rabies. The incubation period varies according to the species involved, the location and severity of the wound, the virulence and amount of virus entering the host, and the susceptibility of the animal exposed. Kelser[11] cites Reichel as follows: horses, twenty-one to ninety days; cows, twelve to eighty days; sheep, twenty-one to sixty days; goats, twenty-one to sixty days; swine, twenty-one to sixty days; cats, fourteen to sixty days.

Rabies in dogs rarely develops sooner than two weeks or later than three months after exposure, although exceptional cases may occur after longer intervals. Among the 120 cases which occurred during the 1950 epizoötic in Colorado, the shortest probable incubation was fourteen days, the majority varied from three to six weeks, and for 1 young dog probably three months. In exceptional cases, the incubation period may be more than a year.

Johnson[9] declares that the distance which the virus must travel from the site of exposure to the brain apparently does not affect the incubation period significantly.

Symptoms in Dogs.—Rabies in dogs is usually manifested in two forms—(1) the dumb or paralytic, and (2) the furious type. However, Hagan and Bruner[8] list three stages: the prodromal, the excitation, and the paralytic. They say:

> The first consists of vague changes in the animal's temperament which may not be noticed or are recognized only by those who are thoroughly acquainted with its habits. In man it is often called the anxiety stage, since the individual feels uneasy and anxious. Pet animals often become unusually affectionate, or normally affectionate ones may shun human society and hide away. The stage of excitation which follows may be very obvious, or it may be wholly absent. In many animals the state of excitement may be obvious, but it is mild and is quickly followed by the third and final stage, that of paralysis. Death from rabies is due to respiratory paralysis.

Dumb Rabies.—Early signs include a change in disposition, anxious expression, unnatural peculiar howling voice, sleepiness, melancholia, and inclination to hide. The eyes and nose usually are congested, and the pupils are often dilated. In Colorado, in 1950, attending veterinarians reported "right pupil dilated, left constricted" in 4 cases. Paralysis of the throat, usually accompanied by a "dropped lower jaw," prevents eating or drinking. Several veterinarians reported "sore throat" in the rabies cases. Soon the dog becomes prostrate, lapses into a coma, and rarely lives more than four or five days. The Colorado State Laboratory received many more cases of the dumb type than of the furious type.

Furious Rabies.—This is the classical "mad dog" type in which the unfortunate animal may first seem inclined to be more affectionate than usual. Children often are bitten when they attempt to pick up or pet this supposedly friendly dog. Restlessness, tremors, and nervousness soon become evident, the animal often biting at imaginary objects, and there is a tendency to eat indigestible substances such as dirt, stones, feathers, sticks, or other trash. The pupils of the eyes are usually dilated and a strange unnatural stare is noted.

Weakness of the vocal chords causes a hoarse howl-like bark. If confined, the dog may attempt to gnaw its way to freedom. If at large, it may wander many miles, attacking any person or object in its path, fighting with other dogs, eventually returning home almost exhausted because of paralysis. One "furious" dog bit off its own tail. The dropped, paralyzed lower jaw is uncommon in furious rabies, but there may be difficulty in swallowing, and excessive salivation or "frothing at the mouth" is common. The usual course of the disease is increasing paralysis, convulsions, marked prostration, and coma ending in death in four to seven days. Occasionally, a dog affected with furious rabies may die suddenly following a fit or convulsion.

Johnson[9] states that sudden death of dogs without appreciable premonitory symptoms apparently is frequent during rabies. Two

such cases occurred during the 1950 outbreak in Colorado.

Symptoms in Other Animals.—Cats also may develop the furious type of rabies and are more feared by some than rabid dogs. A rabid cat has a tendency to hide, acts strange, has a peculiar look in its eyes, mews frequently, and becomes vicious. The next stages are loss of appetite, emaciation, paralysis, coma, and death.

Cattle, which frequently are victims of rabid dogs, coyotes, foxes, or other animals, refuse food, bawl, paw the earth, show signs of cerebral disturbance, become paralyzed, and lapse into coma before death.

*Animal Rabies Diagnosis**.*—The procedure in Colorado is to have the head from any animal dying from suspected rabies submitted to the laboratory as quickly as possible, adequately iced but preferably not frozen.

A detailed history of the case including the breed, age, date of first symptoms, time of death, and especially a statement as to any human exposures or bites should accompany the specimen. An authentic history is invaluable and may be a deciding factor in rendering proper treatment.

Demonstration of Negri bodies in the Ammon's horn of the brain is usually accepted as sufficient proof for a diagnosis of rabies. Well-prepared press preparations stained with Sellers' basic fuchsin and methylene blue, dissolved in methyl alcohol, give highly satisfactory results. In doubtful cases, mouse inoculation may be necessary to establish the ultimate diagnosis, since about 10 per cent of dog brains that appear negative in microscopic tests, as reported by some observers, are found positive upon animal inoculation. Mice usually show symptoms about seven to ten days after intracerebral inoculation with brain emulsion from rabid animals.

During the 1950 epizoötic in Colorado, each specimen was independently checked by Fred P. Meyers, Ph.D., now chief of the laboratories section of the State Department of Public Health, and by the author before a final diagnosis was reached.

Valuable checking of questionable cases was afforded by Drs. Chas. L. Davis and Wayne Anderson of the Branch Pathological Laboratory, U. S. Bureau of Animal Industry, Federal Center, Denver. The latter not only prepare press preparations of animal brains, including the gasserian ganglia, but also make stained histological tissue sections. In a few cases, doubtful or negative to press preparations, it was possible to demonstrate Negri bodies in histological sections in some portion of the brain or the gasserian ganglion.[14]

Animal Rabies Control.—In countries where rabies seldom occurs or is unknown, strict quarantine measures will prevent its introduction. England and Australia have successfully prevented the entrance of rabies by requiring a six-month quarantine of all imported dogs.

One of the most important factors in rabies control is understanding and coöperation by dog owners. If the public is indifferent or if some oppose restrictive measures, because of ignorance or of sentiment, control is difficult to enforce.

Since rabies is widespread in our country, control measures should be considered from a national viewpoint. Some of our states are comparatively free from the disease at present, but there is no assurance they will remain so. With modern methods of travel, people and their dogs come and go constantly from one state or area to another. Adequate congressional authority should be granted to a central government

TABLE I—Officially Recorded Cases of Rabies Among Animals in Colorado and the United States, Compiled by the U. S. Bureau of Animal Industry

Year	Dogs	Cattle	Goats	Cats		Total In Colo.	Total In U.S.
1938	2	0	0	0		2	9,412
1939	2	0	0	0		2	8,314
1940	8	0	0	0		8	7,238
1941	59	8	2	0		69	7,877
1942	34	6	0	2		42	7,165
1943	6	3	0	2		11	9,690
1944	1	0	0	0		1	10,540
1945	4	0	0	0		4	9,963
1946	5	0	0	2		7	10,872
1947	13	0	0	0		13	8,946
1948	1	0	0	0		1	8,508
1949	19	0	0	2		21	7,597
1950	106	4	0	9	1 skunk	120	7,910
1951	3	0	0	2		5	8,022
1952	1	0	0	0		1	8,499

In 1952, the largest number of rabies cases were reported in the following 10 states: Texas, 1,411; Tennessee, 546; Alabama, 535; Virginia, 476; Georgia, 436; Kentucky, 399; Illinois, 384; New York, 388; Mississippi, 307; Pennsylvania, 303.

The total number of cases reported in the United States for 1952 was 8,499: dogs, 5,266; cattle, 919; horses, 38; sheep, 19; swine, 31; cats, 501; goats, 7; man, 21; and miscellaneous species, 1,697. Twelve states showed no cases of rabies for the year.

*The author benefited by a "rabies refresher course" at Atlanta, Ga., conducted by the U. S. Public Health Service prior to the 1950 rabies outbreak in Colorado, an augmentation of many years of experience with rabies while in the service of the U.S. Bureau of Animal Industry.

agency for coöperation with the various states in stamping out the malady.

Schoening[21] expressed the opinion that the public should realize that rabies must be controlled and eventually eradicated from our country, and that its reappearance could be prevented by a six-month quarantine of all dogs imported into the United States.

The chief function of the U. S. Bureau of Animal Industry is the control and eradication of communicable diseases of our domestic animals. Hence, it seems proper that this Bureau should coöperate with the Fish and Wildlife Service and the U. S. Public Health Service to carry out an extensive plan of rabies eradication. Congress should designate dogs as domestic animals in order to authorize the BAI to participate in this plan.

Stray Dogs.—Ownerless or stray dogs can cause great damage if they develop rabies. Other dogs, domestic livestock, wildlife, and human beings are unnecessarily exposed. Consequently, the first step should be the humane elimination or impounding of all ownerless or unvaccinated dogs.

Vaccination.—The mass vaccination of dogs and cats has effectively controlled or eliminated the disease in many localities. Usually, this process is repeated annually to insure maximum and continued immunity. In practically all cases in the rabies outbreak in Colorado in 1950, the dog victim either was unvaccinated within one year of developing the disease or had been vaccinated less than thirty days, the period usually required to reach maximum immunity.

When wild animals such as foxes, skunks, coyotes, and other species are involved, the partial extermination of these creatures may be mandatory. Such a procedure is often difficult, and sportsmen may repel such measures because their game may become scarce.

Occasionally, complications follow vaccination and are manifested by postvaccinal cerebral symptoms and death. During recent years, however, the type and quality of rabies vaccine has materially improved. The newer type vaccine, of chicken embryo origin, promises more lasting immunity, with less after-effect, than the older products. Cox[5] reviews the progress made experimentally with this type of vaccine in dogs, and thus far the results appear to be encouraging. Many Colorado veterinarians are using this vaccine with reported satisfactory results. It is hoped the same type of vaccine for human use will be available in the near future.

Hagan and Bruner[8] advise that a higher grade of immunity can be produced in dogs by multiple, rather than single, injections. Persons who have valuable dogs and desire the best avaiable protection should have three injections at ten-day intervals.

At the Midwestern-North Central Rabies Conference in Omaha in 1951, Tierkel[27] stated that the greatest single contribution to rabies control in recent years has been canine vaccination. For successful control of outbreaks, he recommends reduction of susceptible animals in a given area by mass immunization campaigns in which at least 70 per cent of the dogs are vaccinated as immediately as possible.

In his paper on the 1950 epizoötic in Colorado, Cleere[3] reported the vaccination of 35,900 dogs representing more than 70 per cent of the estimated dog population of 50,000 in the Denver metropolitan area. This wholesale vaccination, including a few cats, stopped the outbreak.* Only 5 cases were reported in 1951—3 dogs and 2 cats, none of which had been vaccinated for rabies.

State and municipal regulations against importation of infected dogs, and laws requiring vaccination of dogs are also aids in the control of rabies. In April, 1950, the epizoötic year in Colorado, the State Board of Health adopted the following regulation:

> All dogs imported into the State of Colorado by any method and for any purpose whatsoever shall be accompanied by an official health certificate, issued by a veterinarian approved by the state of origin. Such certificate shall state that the dog is in good health and free from contagious, infectious or communicable disease, also that such dog has been immunized against rabies not less than thirty days, nor more than twelve months, prior to the date of entry into Colorado, and within the past twelve months the disease

*During the 1950 epizoötic in Colorado, Dr. Martin D. Baum was director of Veterinary Public Health Services for the State Department of Public Health. In coöperation with Dr. M. H. Riemenschneider, Colorado state veterinarian; Drs. Robert K. Anderson and James B. Ashcraft, chief and assistant chief, Veterinary Public Health Service, Department of Health and Hospitals, Denver; and members of Denver Veterinary Medical Society, a program of mass vaccination of dogs was instituted. In addition to the above personnel, Dr. E. S. Tierkel, U.S. Public Health Service, Atlanta, Ga., aided materially in carrying out the immunization program. His plan of operation was essentially the same as carried out for the control of an outbreak of rabies in Memphis and Shelby County, Tennessee.[25]

rabies has not existed within the 50-mile radius of the point of origin.

The Denver City Council also passed an ordinance requiring vaccination of dogs annually as discussed by Ashcraft[1] at the Omaha Rabies Conference.

RABIES IN MAN

Human rabies may be either the dumb or furious type, with clinical symptoms not unlike those in animals. The incubation period is variable, depending on the location and the severity of the wound, the amount of virus injected and other factors. The period of incubation may range from a minimum of fourteen days to seven months or more.

Symptoms and Diagnosis in Man.—The onset of the disease is marked by fever, occipital headache, malaise, anorexia, nausea, and sore throat. Vomiting may be protracted, the respiration shallow, and the speech of a sighing character. Nervousness, irritability, anxiety, insomnia, depression, and melancholia may develop early in the disease. One of the symptoms[10] is some abnormal feeling at the site of the infection. It may be pain or sensations of burning, itching, or tingling about the wound. Objective signs include increased activity of muscle reflexes, spasmodic twitching of the face, and overactive facial expression. The pulse is rapid, the pupils are dilated, lacrimation and salivation are increased, and there is excessive perspiration.

The outstanding symptoms of rabies in man are related to swallowing. The presence of food or water in contact with the fauces causes spasmodic contractions of the muscles of deglutition, and the sight, smell, or sound of liquid may precipitate muscle spasm of the throat. Hence, the term "hydrophobia," or fear of water, is applicable to human beings suffering from rabies. Choking and convulsive seizures are common and may produce opisthotonos. The clinical course of rabies in man may resemble poliomyelitis or other viral or rickettsial infections that produce brain or encephalitic disturbances.* Tetanus should be considered in the differential diagnosis, although this disease usually has a shorter incubation period. Once the symptoms of rabies develop in man, there is no known cure and death is inevitable.

Prophylaxis in Man.—The value of antirabic treatment has been known ever since Pasteur successfully vaccinated Joseph Meister, a 9-year-old Alsatian boy, on July 6, 1885, following the bite of a rabid dog. In spite of marked improvements in the quality of the rabies vaccine and in the methods of use, there is still a grave element of danger experienced by certain allergic or hypersensitive individuals.

In the "Laboratory Manual for Physicians, Aids in Diagnosis and Treatment," issued in 1951 by the Division of Laboratories and Research, New York State Department of Health, the following recommendation is made:

> There is much to be said in favor of the use of antirabies serum since significant immunity can be obtained immediately following the injection of the recommended prophylactic dose, and the hazard of serious paralytic reaction frequently associated with the administration of long courses of vaccine is avoided. It is recommended that a dose of 0.5 ml. per kilo of body weight be administered intramuscularly after appropriate sensitivity tests have been carried out. This single dose of serum should be administered preferably within twenty-four hours following the bite.

During prevalence of rabies in a community, every biting dog or cat should be under suspicion. The wound caused by an animal bite should be cleaned as soon as possible with green soap or other soap and water, and the family doctor consulted for further treatment. At one time, fuming nitric acid was applied to the wound, but this method has become obsolete and other measures substituted. Many physicians administer tetanus antiserum for every dog bite, on the theory that dogs' teeth are apt to be contaminated with tetanus organisms.

Decision as to who should receive vaccine therapy is an exceedingly important problem. In ordinary medical practice, the attending physician makes the decision although he usually consults the family, especially in the case of a child exposed to a rabid animal. All available facts pertaining to the case — the severity, number, and location of the wounds, whether the bitten person was protected by clothing, and other vital data — should be considered.

According to the Metropolitan Life Insurance Company figures cited by Kelser,[11] out of every 10 human deaths from rabies

*Interested persons are referred to Johnson's extensive article on rabies in Rivers' book,[10] "Viral and Rickettsial Infections of Man," only a few symptoms being mentioned here.

6 occur among children under 15 years of age, and more deaths occur between 5- and 10-year-olds than in any other age group. Boys are more often victims, 7 out of 10 rabies deaths of children under 15 years being males. Not only are children attacked by rabid dogs more often than adults, but the incubation period in children is shorter and allows less time for protective treatment.

According to Sellers,[22] exposed persons should be considered for vaccination:

If the animal is clinically rabid, even though postmortem brain examination fails to reveal Negri bodies.

If the clinical behavior of the animal before death was not rabid, but the brain shows Negri bodies.

If the animal is not available for examination.

If the animal bites without provocation and is immediately killed, even if the laboratory findings are negative.

Rabies vaccine should be given to persons exposed as follows:

If wounds (presumably from a rabid animal) have penetrated the skin.

If wounds were inflicted through clothing torn by the animal's teeth.

If it is suspected that the saliva contacted fresh, open, or pre-existent abrasions.

If the exposed person is too young to give reliable testimony.

Vaccine should not be administered:

When there is no broken skin anywhere on the body, including face and mouth.

If any previous wounds are known to be over twenty-four hours old or are covered with an unbroken scar.

If tooth wounds were made through untorn clothing (usually bruises).

If exposure is limited to merely handling an animal or objects contaminated with the saliva; or to drinking the milk of rabid cows or goats.

If the wounds were inflicted not less than seven days prior to detection of visible signs of the disease.

If the animal remains normal for as long as seven days after inflicting the wound.

RABIES FROM MILK OR MEAT

The possibility of acquiring rabies from milk consumed raw from infected cows or goats is debatable.

Mohler[15] reports that at times the rabies virus may be excreted in the milk of rabid animals, and Johnson[9] isolated the virus from lactating gland tissue of infected dogs.

On the other hand, Hagan and Bruner[8] failed to demonstrate rabies virus in the milk of infected cows, and Mugrage[18] was unable to show the virus in rabid nursing rabbits. It is conceded that the rabies virus is destroyed by the gastric juice in the normal gastrointestinal tract, but there is a question of what would happen if a person who suffered from peptic ulcer, diseased tonsils, gingivitis, pyorrhea, abrasions of the lips, or other abnormal conditions of the digestive system, would use raw milk from a rabid cow.

Mohler[15] concludes that the milk or meat from rabid animals is potentially dangerous and must be considered unfit for food. The federal meat inspection regulations provide for the total condemnation of carcasses from such animals.

SUMMARY

The nature of rabies and its world-wide distribution is discussed, reflecting the incidence of the disease in the Rocky Mountain area.

Rabies in animals, the incubation period, and the symptoms commonly observed are described in both dumb and furious types.

Laboratory diagnosis of rabies is outlined, comprising the microscopic and histological examination of suspected animal brains.

Measures for the control of rabies include impounding stray dogs, vaccination of animals, and quarantine measures.

The vaccination of approximately 70 per cent of the estimated 50,000 of the Denver dog population apparently controlled the epizoötic during the 1950 outbreak.

Rabies in man, incubation period, symptoms, and prophylaxis measures are presented in detail. Persons who should, and those who should not, receive antirabies vaccine are briefly cited.

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Paralytic Rabies in Cattle

In Costa Rica, a 6-year-old bullock was removed from work because of weakness. The next day he developed a stumbling gait and in four days was down on his side making swimming movements and knocking his head on the ground. When killed, Negri bodies were found in the brain. By the passage of brain material through rabbits and mice, a virus was produced capable of causing paralytic rabies in mice after a seven-day incubation period.—*Vet. Bull., Dec., 1953.*

National Dog Guild to Study Rabies

The National Dog Welfare Guild, a nonprofit organization made up of dog owners throughout the United States, lists as one of its special projects for 1954 the collecting of information on rabies and making up specific recommendations on how this disease can best be controlled. The Guild will study reports on rabies by the American Veterinary Medical Association, the U. S. Public Health Service and others, to weed out contradictions and fallacies regarding the existence of the disease and the effectiveness of vaccination. It then will formulate its own policies regarding elimination of the disease.

The Fox as a Reservoir for Rabies.—In New York State, vaccination has controlled rabies in dogs so effectively that the fox is now a chief reservoir for the disease. In a recent year, the state had 400 cases in cattle, 400 in foxes, and only about a dozen in dogs. Rabid foxes can seldom be trapped since they have only two lures, food and sex, and when rabid they are interested in neither.—*W. A. Hagan, D.V.M., Ithaca, N. Y.*

Equine Laparotomy

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IN SPITE OF the modern methods of sterilization, improved aseptic surgical technique, and the large variety of antibiotics at our disposal, a prejudice against laparotomy in the horse still exists in the veterinary profession. It might be stated that few indications exist for this type of equine surgery. However, in this locality we have long recognized its necessity due to the high mortality from intestinal impactions. Unfortunately, most impactions observed at autopsy are found at the diaphragmatic flexure of the large colon where they are not accessible by rectal palpation. Death is inevitable as these hard masses defy reduction by most therapeutic means, except rectal massage.

Recently, 2 cases were presented which forced us to attempt this type of surgery. A yearling Shetland pony, much too small for rectal palpation, was presented with a history of colic of three days' duration. There had been no bowel passages in this period, and considerable intestinal flatulence was present. Twelve hours after therapeusis with agents ranging from oils to lentin had failed to produce results, we decided to do a laparotomy.

OPERATIVE TECHNIQUE

Pentobarbital sodium was used intravenously for anesthesia. Saline and dextrose solution was administered intravenously continuously during surgery. The left flank was prepared by clipping, scrubbing, and skin antisepsis. Aseptic technique was adhered to as rigidly as possible throughout the operation. A liberal vertical incision was made through the skin and underlying tissues to the external oblique muscle. The muscles were separated, by blunt dissection, in the direction of their fibers and the peritoneum was incised with scissors. The small colon ballooned up into the operative area and was aspirated with a sterile needle. The impaction was found in the proximal portion of the small colon. It was moved away from the site of occlusion by massage and broken down by manual manipulation.

The intestines were dusted with surgical aureomycin powder. The peritoneum and transversus abdominis were sutured with No. 1 chromic gut; No. 2 chromic catgut was used on the remaining two muscular layers. The skin and fascia were sutured together with nylon and the incision covered with collodion.

After-care consisted of penicillin daily for five days, mild laxatives, and a light ration of good alfalfa and a mixture of bran and rolled oats. Healing was by first intention. Bowel movements occurred immediately following recovery from anesthesia. However, the wall of the colon may have been injured and its elasticity impaired because several months later the condition recurred and again it was necessary to operate. The laparotomy incision was made approximately 1 inch posterior to the former incision. Very little scar tissue was found in the underlying fascia and musculature. The recovery was again complete but quite stormy, requiring nearly ten days.

The second case was also a pony, 3 months of age, small enough to fit quite comfortably on the small animal surgical table, where better aseptic technique than in the previous case was possible. Again, the impaction was found in the small colon and broken down by manual manipulation. The wound healed by primary union and recovery was uneventful.

DISCUSSION

Both subjects were small which made the task of locating the impaction much simpler than it would be in a large horse, especially

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if the obstruction were in the diaphragmatic flexure of the colon. However, the point to be emphasized is that laparotomy in the horse is possible and justified.

Reports indicate that this type of surgery is relatively common in recent years in our better veterinary schools where the finest of facilities are available. Farquharson[1,2] relates a number of successful laparotomies performed on the horse. Woolsey[3] reports a successful operation on a newborn foal to relieve impaction. Behrens,[4] at the Veterinary College of Hannover, recommended laparotomy via the flank in horses and the vagina in mares to break up obstructions in the small colon. An enterotomy in a pony is described by Conner[5] in the treatment of impaction. Jasper and Cupps[6] utilized a laparotomy in experimental procedures dealing with a cecostomy in the horse. The only published article found dealing with successful equine abdominal surgery in general practice was done in pre-antibiotic days by Aitken.[7] In an unpublished report, Hird[8] relates a successful equine intestinal anastomosis performed in his practice.

Equine abdominal surgery in the field has met with a great deal of reluctance. It has been stated that the alleged sensitivity of the horse's peritoneum *per se* is an excuse, not a cause, for dodging major abdominal surgery in the horse.[9] The average veterinarian has adequate training to cope with most difficulties which might arise in the course of such surgery. It should be emphasized that this type of surgery can be performed successfully providing the fundamental principle of sterile technique is employed.

SUMMARY

Three successful laparotomies in 2 ponies are described. Indications are that major equine abdominal surgery in the field is a practical procedure providing strict asepsis is observed.

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An Equine Twisted Intestine Reduced by Surgery

The Blood Horse (Dec. 12, 1953) reports that Dr. E. W. Thomas of Lexington, Ky., with the aid of a physician, successfully performed a laparotomy on a weanling filly and "the twisted gut was found and untwisted." In an earlier, similar case an operation had not been performed because of insurance complications.

The filly had been showing signs of intestinal colic for at least four hours, with a temperature of 101.4 F. She was anesthetized with equi-thesin and duly prepared for surgery. A 6-inch incision was made in the median line. About half of the twisted portion of intestine was dark and beginning to suggest gangrene. There was also a partial strangulation through a small umbilical hernia. After completion of the operation, the filly showed no sign of colic, soon ate a little hay, and in a few hours had a normal bowel movement. Some swelling developed at the site of incision and she had a degree or two of fever the second and third days but by the fifth day she was eating and acting normally. Some of the skin sutures were removed on the seventh day, others on the eighth.

She was given tetanus antitoxin at the time of surgery and daily injections of antibiotics and vitamins during convalescence. She made an uneventful recovery.

Pentothal Sodium Equine Anesthesia

For quick, short duration, general anesthesia in the horse give, while in a standing position, 1/10 gr. of pentothal sodium per lb. of body weight, in a 20 per cent solution (1/15 gr./lb. for debilitated subjects). The animal goes down without struggling and anesthesia is maintained about twenty minutes.—*Surgical Principles and Technics by W. F. Guard. 1953 ed.*

Granular Vaginitis as a Cause of Infertility in Dairy Cattle

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GRANULAR VAGINITIS has been the subject of research by several workers for many years. According to Williams,[11] it was first presented to the veterinary profession as a specific disease of cattle in 1887. However, conflicting opinions are found among statements in recent literature as to its etiology and effect on fertility.

Lockhart, according to Hornaday,[5] believes that the disease is caused by a short chain Streptococcus that he calls *Streptococcus vaginitidis*. McDonald[6] expressed the opinion that the cause was a virus infection. Crawley *et al.*[4] found a gram-negative, medium-sized rod commonly associated with this disease and twice were able to reproduce the disease in heifers with pure cultures of this organism. It has been stated by some workers that the disease is an outstanding cause of infertility.[1,2,5] Bryan *et al.*[2] state that cows chronically affected may breed satisfactorily. Patrick *et al.*[7] found approximately 10 per cent of 2,530 cows affected. The affected animals had a 6 per cent lower fertility than those not affected. Perkins[8] found granular vaginitis in 28 per cent of 1,000 cattle examined at slaughter.

The clinical evidence of this disease consists of small granules found on the mucosa of the vulva and vagina of the cow and on the sheath and glans penis of the male. This writer,[10] in a study of the natural course of the disease, found it in calves as early as 11 days of age. The disease was generally most severe in heifers and young cows. In cows approaching parturition, the nodules were frequently either partially or totally obscured by swelling of the vulvar mucosa. Cows with inflammation and a mucopurulent discharge exhibited nodules which were red and often confluent. In milder cases, with no inflammation or mucopurulent discharge, the nodules were fewer, smaller, and pale yellow. The intensity of the disease, therefore, governs its clinical appearance.

This study was undertaken to find what effect this disease had on the fertility of dairy cattle.

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The author gratefully acknowledges the assistance of the technicians associated with the Kentucky Artificial Breeding Association who observed, classified, and recorded the data used in preparing this paper.

EXPERIMENTAL PROCEDURE

Seven artificial breeding technicians affiliated with the Kentucky Artificial Breeding Association were trained to observe and classify cows for the presence of granular vaginitis. The field experiment was carried out for nine months, from November 1, 1951 to July 31, 1952. The technicians were instructed to observe and classify each cow for the disease before breeding. Observations were made only when there was sufficient light for a thorough examination. In the female, the granules were best observed by holding the vulvar lips wide apart to allow a strong natural light to enter, while observing all parts systematically to avoid overlooking any granules. The granules were most commonly found on the roof of the vulva and around the clitoris.

Cows were classified as "mild," "severe," or not affected. The absence of visible nodules indicated freedom from the disease. Cows having a few nodules with no inflammation were classified as "mild," and those having many nodules with inflammation were called "severe" cases. All observations were recorded in the technician's Herd Record Book for tabulation and analysis at a later date.

A total of 4,616 cows were observed in the nine-month period. All cattle observed were allowed sixty days or more following breeding to return to service before the fertility data were tabulated.

RESULTS

Of the 4,616 cows examined, approximately 49 per cent showed no evidence of granular vaginitis, 44 per cent showed mild symptoms, and 7 per cent showed severe symptoms.

TABLE I—The Effect of Granular Vaginitis on the Fertility of Dairy Cattle

Classification of granular vaginitis	Cows bred (No.)	Nonreturns (%) (60 days or more)
None	2,262	68.9
Mild	2,065	65.7
Severe	289	58.1
Total	4,616	66.8

It was also found that cows with mild granular vaginitis had a fertility rating 3.2 per cent lower (table 1) and those severely affected 10.8 per cent lower than cows not having the disease. When the *chi*-square test[9] was applied, the differences in conception rates were found to be highly significant. Even though there was a definite trend toward lower fertility in the

affected cows, it should be noted that the average for the most severe case was 58.1 per cent, a fairly satisfactory fertility rating.

Analysis of variance was used in order to determine whether differences by months, or differences in the fertility obtained by the seven different inseminators, had any effect on the experimental results. It was found that neither had significant effects on the fertility. Therefore, it is assumed that the differences found between the groups was due to the granular vaginitis. There may be some variation in the ability of inseminators to classify granular vaginitis and it is possible that natural mating may yield slightly different results from artificial breeding. However, it appears probable that granular vaginitis does lower fertility level slightly.

SUMMARY

A total of 4,616 dairy cows were observed and classified as to the severity of granular vaginitis, by seven different artificial breeding technicians affiliated with the Kentucky Artificial Breeding Association. Approximately 51 per cent of the animals were affected. Granular vaginitis apparently lowered the fertility of cows about 3 to 10 per cent depending on its severity. Even so, the cows classified as having severe cases of vaginitis had a fertility rating of 58.1 per cent which is considered relatively high.

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Embryonal Nephroma with Metastasis in a Dog

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The comparative rarity of embryonal nephroma (so-called Wilms' tumor) in dogs would seem to justify recording the occurrence of a neoplasm of this type in a puppy.

Case Report.—A 6-month-old, 25-lb. female Springer Spaniel was taken to a veterinary hospital for routine ovariohysterectomy. Physical examination revealed a somewhat distended abdomen and an intermittent dyspnea. Palpation indicated the probability of a growth in the abdomen. Upon exploratory laparotomy a large, whitish, firm, and well-encapsulated neoplasm was encountered. Its surface was studded with a number of nodules beneath the capsule. The mass was fused to the

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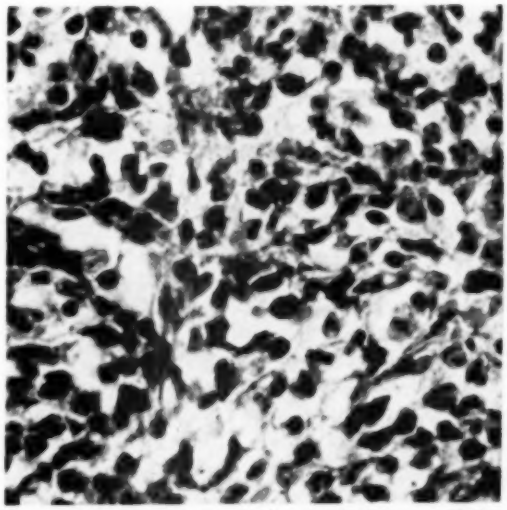

Fig. 1—Mesenchymatous cells, chief elements of the tumor. x 500.

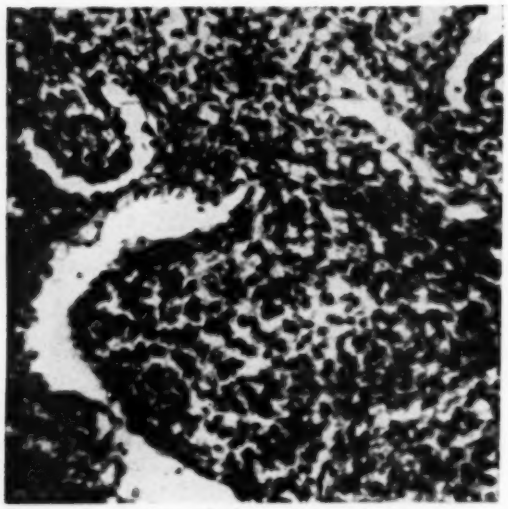

Fig. 2—Suggestions of glomeruli in pulmonary metastasis. x 250.

omentum and secondary, spherical, soft, white masses were seen on the surface of that part adjacent to the main tumor. Removal necessitated the ligation of large blood vessels. A portion of the omentum was also removed. The material was sent to our laboratory for examination.

The principal mass proved to be an enlarged kidney. Nearly all of the functional nephritic structure had been replaced by neoplastic tissue. The organ measured 9.0 by 10.0 by 12.8 cm. Smaller, secondary nodules varied in size from 2 to 10 mm. On section, the neoplasm was dense and its center necrotic. The residual portion of kidney was completely without cortex and the medulla was compressed into a narrow band.

One month later, the animal having died, its carcass was received for necropsy. The abdomen was enlarged and, when opened, disclosed, at the site of the original tumor, masses of new tissue resembling a bunch of grapes. Individual nodular growths ranged up to approximately 20 mm. in diameter. The mesentery and the remaining omentum were studded with similar but smaller nodules. A single small nodule was found in the liver.

The lungs were remarkable. Though normal in size and shape, their substance was so filled with spherical masses of white nodules that normal tissue was scarcely in evidence. The tumors were not coalescent, and they varied in size from a few to several millimeters in diameter.

The remaining kidney was enlarged and "domed" or bulged at one point. On section it showed a whitish, spherical growth 2 cm. in diameter between the cortex and the medulla. Other viscera were grossly normal.

Histopathology.—Sections of the primary growth and the pulmonary metastases were stained with hematoxylin and eosin. The structure consisted almost entirely of rather primitive undifferentiated mesenchymal cells, with pleomorphic nuclei and highly irregular cytoplasm (fig. 1). At the periphery of some of the small secondary nodules in the lung, the tissue was almost mucoid in character, intercellular fibrils being most prominent. Some structures had a vague resemblance to the tuft of a glomerulus (fig. 2).

A few epithelial cells were seen as tubular structures, but these were not sufficiently prominent to justify the older designation "adenosarcoma." The variable morphology is characteristic of embryonal nephroma and suggests the multipotency of the parent tissue from which these tumors arise.

Comment.—This case presents at least two points of interest. First, embryonal nephroma is a rare tumor in dogs. A footnote in Jackson's work[1] even states that this tumor does not occur in the canine species. Neither Feldman's monograph[2] nor Mulligan's[3] mentions its occurrence in dogs. However, a recent case was described by Jones.[4] Second, as a matter of speculation only, it seems reasonable to ask whether this growth arose bilaterally or whether the unremoved kidney had been invaded by hematogenous metastasis from the extensively involved lungs. The latter seems the more likely possibility.

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Esophageal Diverticulum Repair

According to the *American Journal of Surgery*, January, 1954, European surgeons now favor a simple inversion rather than an excision of the diverticulum after separating the overlying fascia. The inverted portion becomes small and does not cause dysphagia. Support is given by repairs to the outer wall.

Intra-Uterine Antibiotic Therapy Postservice in Infertile Dairy Cattle

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LIMITED studies have shown that lowered fertility in dairy cattle is frequently associated with a variety of nonspecific bacterial infections. Various workers[1-6] have reported the isolation of Micrococcus, Corynebacterium, Neisseria, and other organisms from the genital tracts of infertile cows.

Chambers[7] reported the successful use of antibiotics in treating infertile cows. Easterbrooks and Plastridge[8] reported the use of streptomycin and penicillin for the intra-uterine treatment of infertility due to Vibrio infections. Ulberg *et al.*[9] studied the effect of antibiotic infusions of the uterus of shy breeding dairy cattle that showed no recognizable clinical pathology. In their work, a higher percentage of the controls conceived than did the treated cows.

Easley *et al.*[5] reported that 65 per cent of 20 cows conceived when treated with an intra-uterine injection the day following service. These workers found that an additional 3 conceived the following service for a total of 80 per cent conception from this type of treatment.

The work reported herein is based on the premise that the major cause of infertility in dairy cattle is infection of a nonspecific type, and that some gross pathology may be recognized by a skilled observer in a large percentage of the cases.

MATERIALS AND METHODS

The data presented here was collected from several commercial dairy herds in which the author practices artificial insemination and the treatment of sterility. These herds consist of good cows of the major dairy breeds. The general feeding and management practices are considered good. All cows have calved one or more times.

Some of the defect in the conception rate is due to the insemination service being provided only four days a week. However, when a cow is returned for a third service, she is considered to be suffering from some degree of infertility. A careful observation is then made to determine the reason for her breeding difficulty.

An examination may reveal a few flakes of pus in the vulva and possibly an inflamed vagina. The rest of the genital tract is examined by rectal palpation.

The cervix of the healthy cow is easily grasped in the palm of the hand and measures from 3 to 4 cm. in diameter depending on the age and breed of the cow. Cervicitis may be present in the slow-breeding cow evidenced by an enlarged cervix, and the inflamed posterior cervical folds may be everted. An attempt is made to observe the cervical mucous which may show clouding or flakes of pus. In some types of infection, the mucus is abundant and very thin.

In cows with endometritis, the uterus is usually more pendulous than normal and, the uterine wall usually feels flabby and lacking in tone. In a few cases, the uterine wall is acutely inflamed, thick, and edematous.

Little attention has been paid to the fallopian tubes during the initial examination. They are not frequently involved unless there has been a severe and long-standing endometritis. However, in cases which fail to respond to one or two intra-uterine infusions, a chronic salpingitis may be found.

In the normal cow at estrus, a single follicle 8 to 15 mm. in diameter should be palpable on one ovary. The corpus luteum should have nearly disappeared. If the ovaries are enlarged and irregular, it is usually an indication that they are cystic. Finding ovarian pathology suggests an endocrine, rather than an infectious, basis for the infertility. However, in some cases, both may be factors. There may be a relationship, in some cases, between endocrine dysfunction and genital infections.

A cow becomes a candidate for intra-uterine therapy if bred unsuccessfully two or more times, and if examination of the genital tract indicates that an infection may be responsible. The intra-uterine infusion is given on the first or second day following service, whichever is most convenient. In the majority of cases, treatment was administered on the second day following breeding.

Various preparations have been used for the uterine infusions, three of which are reported here: streptomycin sulfate, 1 Gm., and penicillin sodium or potassium, 200,000 to 500,000 units dissolved in (A) 50 cc. of sterile saline solution; (B) 50 cc. of sterile distilled water; or (C) 12 per cent of sulfapyridine solution.

The intra-uterine infusions were given with a Chamber's- or Woelffer-type of uterine catheter to which a 50-cc. glass syringe was attached. An attempt was made to place the solution in both horns of the uterus; this was followed by a brief massage.

The controls consisted of untreated cows in the same herds, which returned for service a third time. However, some of these cows were treated at subsequent estrous periods.

Dr. Lindley, a general practitioner, is now practicing in Glendora, Calif.

RESULTS

Table 1 shows the results of the postservice treatments used. All three treatments produced a marked increase in conception over the control animals. The pregnancies that resulted proceeded to normal parturition with the same frequency found in cows breeding normally.

TABLE I—Results of Postservice Treatments Used

Treatment*	A	B	C	Controls
Number treated	82	51	9	48
Number conceived concurrent estrus	53	26	7	16
Percentage conception	64.63%	50.98%	77.77%	33.33%
Number conceived first estrus after treatment	11	5	1	....
Total percentage conception	78.05%	60.78%	88.88%	....
Number that conceived at later estrus	9	12	0	....
Number culled	9	8	1	....

*Treatment consisted of streptomycin sulfate, 1 Gm., penicillin sodium or potassium, 200,000 to 500,000 units (A) in 50 cc. of saline solution; (B) in 50 cc. of sterile distilled water; (C) in 50 cc. of 12 per cent sulfapyridine solution.

Sterile saline solution appeared to be superior to sterile water as a vehicle although the differences were not significant when analyzed by the *Chi*-square technique. The writer believes the difference is real, however, as it was consistent throughout the observation.

The sulfapyridine solution containing the antibiotics appeared to be superior to the antibiotics alone, although the number of cases treated was too small for a satisfactory comparative evaluation. Here, again, from a statistical standpoint, the difference between treatments C and A was not significant.

The conception rates of treatments A and C were highly significant when compared with the controls, and treatment B closely approached significance at the 5 per cent level.

Cows that returned for service beyond the first estrus after treatment were usually treated again. In some cases, endocrine treatments were found advisable, and in others additional intra-uterine infusions were given. If an additional infusion was given, it was usually fortified by the addition of some other antibiotic or chemotherapeutic agent. Sulfonamides, furacin, bacitracin, and tyrothricin are the agents which have been most commonly added. Additional treatment frequently resulted in successful conception.

DISCUSSION

Woelffer[10] preferred to use intra-uterine infusions during the anestrous period, preferably seventy-two hours before service. Chambers[11] has recommended intra-uterine therapy during estrus. Fincher[12] points out the dangers of interfering with conception by treating the cow at estrus, prior to breeding.

The use of intra-uterine infusions one or two days after service offers several advantages: (1) There appears to be no interference with conception; (2) no additional time is lost, and dairymen feel there is considerable economic loss from delays in conception; (3) it is convenient in herds where several visits are made weekly. If the cow must be treated in estrus before she is bred, it becomes almost an emergency call and if treated later, between estrous periods, an existing pregnancy may be interrupted.

Fincher[12] refers to work which indicates that the spermatozoa reach the ovary within two and one half to five minutes after copulation or insemination, and that an infusion might be given as early as ten minutes after breeding. The writer has infused the uterus of several cows within a half hour after insemination without interfering with conception. However, this practice has been used only where it was impractical to treat the cow one or two days later.

Winters *et al.*[13] found that bovine embryos reached the uterus by the fourth day. Therefore, treatment completed on the first and second day postservice should least interfere with conception and yet allow time for reduction of the bacterial flora of the uterus.

SUMMARY

Data on the use of postservice intra-uterine infusions has been presented. Antibiotics and sulfonamide solutions infused one or two days following service has been shown to increase the conception rate of cows that are hard to breed without interfering with pregnancy from that service.

The procedure is practical for both the veterinarian and the owner in that treat-

ment may be conveniently instituted without additional delay in conception.

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Surgery for Cataract in a Monkey

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An adult, 12-lb. spider monkey at Lincoln Park Zoo, Chicago, had been blinded for at least a year with bilateral cataracts. The monkey was in good general health and, in spite of blindness, moved freely around its cage. In consultation with an eye specialist and surgeon, Homer Field, M.D., it was decided to operate on the right eye.

Dr. Fisher is a small animal practitioner in Berwyn, Ill.

Fig. 1—The adult spider monkey after a cataract had been removed from the right eye.

The animal was given 1/8 gr. of morphine subcutaneously and one hour later, for anesthesia, approximately 2 gr. of pentobarbital sodium intravenously. The eye and surrounding area were then prepared. An incision was made into the anterior chamber starting dorsally and following the limbus medially and laterally for a total of 180 degrees. To facilitate the operation and prevent prolapse, a small dorsal portion of the iris was removed with scissors. The lens was then grasped with forceps, freed by manipulation, and withdrawn. However, because of its tumescent condition it burst, so the remainder had to be expressed.

The area was then irrigated with normal saline solution. The fine dermal sutures, with which the eye had been anchored at the start of surgery, were used to close the incision. The upper eyelid was then drawn down over the eye and sutured to the lower eyelid. This was intended to serve for at least two days as a bandage but, somehow, the monkey removed these sutures the following day. Penicillin was injected subcutaneously and atropine instilled into the eye daily for three days.

Recovery was uneventful, with the animal soon indicating the return of vision. Several months later, similar surgery was successfully performed on the other eye.

Estrogens as Lactation Stimulants

Lactation can be induced with estrogens such as stilbestrol in 70 per cent of unbred heifers, sterile cows, and goats, but less than 50 per cent produce commercially profitable quantities of milk. The subcutaneous injection of oily solutions or the implantation of pellets are the most practical means of administration. Treated animals are almost constantly in heat; their behavior resembles nymphomaniacs, their ovaries are small and inactive, and the estrous cycle is absent. Physical changes result in frequent pelvic and other fractures and dislocations. Because of the uncertain results and undesirable side effects, this treatment is not recommended.—*Nat. Acad. of Science, March, 1953.*

Effect of Prolonged Stilbestrol Administration on Ewes

Sheep maintained on subterranean clover pasture developed pathological changes in the reproductive tract and usually sterility or dystocia. These were assumed to be due to estrogenic substance in the clover. The remarkable feature was that it could produce cystic glandular hyperplasia of the endometrium and chronic infertility with so little disturbance to the estrous cycle. Similar conditions had been produced experimentally in guinea pigs and rabbits.

Therefore, 60 normal yearling ewes, in groups of 10, were given diethylstilbestrol intramuscularly on alternate days for six months; they were then placed in the breeding herd for three years. Enlargement of the mammary glands, more pronounced with higher doses, was evident in fourteen days, increased for about three months, then began to recede. Those given the larger doses, 4 to 16 mg., showed loss of weight and ill health in six to eight weeks. The estrous cycles were rather irregular in treated ewes. The 10 untreated ewes produced 28 normal single lambs in three years. The 50 treated ewes produced only 1 lamb the first year and it was stillborn. In their second and third years, they produced a total of 10 normal lambs and 8 dead or weak lambs. Six of the ewes had dystocias.

In a later one-year experiment using four groups of 15 ewes each, smaller doses of stilbestrol were given on alternate days for six months. The 15 controls produced 2 dead and 11 normal lambs; the 15 given 0.11-Gm. doses had 5 lambs, 1 normally, 4 with dystocia; the 15 given 0.33-Gm. doses had 4 lambs, 1 normally, 3 with dystocia; while the 15 given 1.0 Gm. had only 2 lambs, both dead.

All the ewes in experiment 1 were necropsied. The ovaries, oviducts, and vagina of all could be considered normal but most treated ewes exhibited a cystic endometritis similar to that found in the ewes which had been affected after grazing on the subterranean clover.—*Austral. Vet. J., Aug., 1953.*

Stilbestrol for the Mismated Bitch

Dr. W. F. Jackson, Lakeland, Fla., reports that a single injection of diethylstilbestrol implant, which is absorbed slowly, prevented conception in all of 12 canine females when used within a few hours after breeding.—*California Vet., Nov., 1953.*

Effect of Light on Turkey Breeding

Extending December days to fourteen hours with electric lights will start 8-month-old turkey hens laying in three or four weeks. Sexual maturity in males is also reached earlier. However, egg fertility begins to drop in two or three months and may be down to 50 per cent by June. By keeping a reserve supply of toms on eight hours of light per day until April, and then gradually increasing the light, they will mature late for substitution in May; thus, high egg fertility may be maintained for seven or eight months.—*Agric. Res., Nov., 1953.*

An Intestinal Decompression Sound

The mortality in intestinal obstruction has been reduced in man by decompressing the gastrointestinal tract prior to surgery. Upon opening the abdomen, the proximal distended loop of intestine is incised to allow the entrance of a suction tube which is used to empty first the proximal part of the intestine then the distal part as far as the obstruction. A catgut purse string loop, placed in the wall of the intestine around the spot to be incised for the sound, is pulled snug to prevent leakage and closes the opening when the sound is withdrawn. —*Am. J. Surg., Jan., 1954.*

CLINICAL DATA

Crystalline Hexylresorcinol in the Treatment of Ascariasis and Ancylostomiasis in Canidae

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THE QUEST for an effective, safe drug for the expulsion of ascarids and hookworms from both man and animals is very old. Ridding the human patient of intestinal parasites was for some time considered a serious procedure and violent methods have been employed. The latter still holds true with many therapeutic procedures used in veterinary medicine, but unfortunately the seriousness of the treatment is often overlooked. In view of the unrecorded efficiency of certain vermifuges available today, a series of carefully controlled experiments was conducted to determine the effectiveness of an anthelmintic long known for its margin of safety.

Although the number of animals employed in this study is insufficient to establish tthe actual toxicity of the drug, an extensive review of the literature is presented for consideration. The effectiveness of hexylresorcinol as an anthelmintic has been recognized for several decades. As early as 1930, the drug was used with gratifying results in human medicine. The results reported show that "hexylresorcinol, given in crystalline form in hard gelatin capsules, will remove 90 per cent of the hookworms in a group of cases if precautions are taken to see that no food is allowed for sometime before as well as after treatment."[1] One year later, more than 2,200 cases harboring Ascaris spp., Ancylostoma spp., and Trichuris spp. were treated with the same product and, via the Stoll egg-counting method,[2] the effectiveness of the drug was indicated in the following order: ascarids, 90 per cent; hookworms, 80 per cent; and whipworms, 50 per cent.[3] The same author reports a limited number of Taenia spp. infections that have been treated with favorable results. In the same year, it was also demonstrated that hexylresorcinol inhibited the normal development of both hookworm and ascarid eggs.[4] In the field of veterinary medicine, a preliminary report as early as 1935 might be condensed in a sentence as indicating that "hexylresorcinol in crystalline form of 0.2 Gm. each, gives promise of being the most satisfactory agent for the treatment of ascariasis in puppies and is also reasonably efficacious in cases of uncinariasis."[5] The following year, Horning[6] reported satisfactory results with hexylresorcinol and recommended the drug for treatment of hookworm infestations of Canidae.

Hexylresorcinol has been chosen from a group of phenols and resorcinols, all of which act on ascarids, because of its well-known lack of toxicity.[7-10] Careful histological studies, made of the various organs of the body after single large doses of hexylresorcinol and even after repeated administrations over long periods, failed to show any pathological lesions.[7] Most of the anthelmintics are given with a constant fear of absorption and subsequent intoxication. Hexylresorcinol differs from these by being relatively nontoxic even after absorption. It has been used on thousands of patients for its urinary antiseptic properties as it is excreted in the urine.[9]

Concerning the mode of action of an anthelmintic, it may: (1) produce narcosis or paralysis of the parasite but not necessarily death; (2) produce narcosis or paralysis from which recovery does not take place; (3) act upon the cuticula, killing the worm; (4) digest the parasite; or (5) cause unexplained death.

Hexylresorcinol appears to act on the cuticula of the worm causing blisters, fol-

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This work was supported in part by a grant from Sharp & Dohme, Inc., Philadelphia, Pa.

lowed by death. *In vitro*, the worms become still and immoble in dilute solutions and do not recover.[7] The parasite is thus prevented from migrating and obstructing the intestine or inlet ducts.

MATERIALS AND METHODS

Twenty-five dogs were employed as subjects for testing the efficiency of the product under consideration, canine crystoids.® The animals ranged from very young pups to senile dogs. The type of infestation was determined by the egg-flotation method (saturated sodium nitrate) and an attempt was made to secure as many combination infestations as possible. The majority of animals used were in a somewhat poor physical state and, under normal clinical circumstances, the administration of an anthelmintic would have been considered hazardous. This was especially true when young puppies were concerned, as in each case there was an upper respiratory infection thought to be secondary to either malnutrition, parasitism, or the virus of Carré.[11] Animals of this type were purposely selected in an effort to acquire a better evaluation of the toxic properties which the drug may possess.

In each case treated, extreme caution was taken to ensure that all food was withheld a minimum of twelve hours prior to, and twelve hours following, administration of the anthelmintic. The animal was allowed water throughout treatment. The dosage of the drug was determined in accordance with the manufacturer's directions, and a saline purgative (magnesium sulfate) was given twenty-four hours after administration.

Immediately after treatment, the animals were placed in separate cages and each cage was equipped with a special collecting pan to facilitate the preservation of all fecal material. For three days following administration of the anthelmintic, all droppings were collected at twelve- to 24-hour intervals. Each collection was thoroughly decanted and the residue examined under magnification. In this way, the expelled worms were collected, classified, and counted. At the end of seventy-two hours, the animals were killed and the same procedure of decantation applied to the contents of the entire alimentary canal. Precautions were taken to remove, as far as possible, all remaining worms that were attached to the wall of the alimentary tract. In this way, an accurate determination of the percentage of effectiveness could be made. However, even this procedure had its limitations.

RESULTS AND DISCUSSION

The results of the studies using hexylresorcinol as an anthelmintic are summarized by species of parasite in table 1.

The results obtained for ascarid and hookworm infestations were in close agreement with those reported from earlier studies. Where whipworms were concerned, however, there was a wide difference in the effectiveness of the drug noted in this study as compared with earlier reports. A possible explanation is that Trichuris spp. are more subject to autolysis, but it seems hardly plausible that at least some fragments of the dead parasite would not be recovered.

TABLE 1—Results of Using Hexylresorcinol as an Anthelmintic

Dogs		Total worms		Worms removed	
(No.)	Parasite	(No.)	(Ave.)	(No.)	(%)
16	Ancylostoma spp.	127	7.9	111	87.4
17	Ascarids	109	6.4	107	98.1
8	Trichuris spp.	73	9.1	0	0
2	Taenia spp.	7	3.5	6	85.7
6	Dipylidium caninum	unknown	unknown	numerous segements	unknown
3	Spirocerca lupi	2 cases worms left in cysts	uncounted	0	0

Microscopically, the feces of 1 dog was positive for Ancylostoma spp., though none were removed and none recovered at autopsy. This animal had no bowel movement for fifty-six hours after treatment, during which time there might have been complete digestion of the dead parasites.

No activity, either positive or negative, was noted with regard to coccidia infections.

Further research would be indicated in an attempt to determine the effectiveness of hexylresorcinol as a taeniacide. Only the scolices were counted and those of Taenia spp. were the only ones recovered. This could well be due to the minute size of the scolex of *Dipylidium caninum* and these usually undergo total degeneration prior to being expelled from the host. A different type of an experiment would be necessary for an accurate study involving this parasite. No strobila of either Taenia spp. or *D. caninum* were recovered on autopsy. These observations, plus earlier reports from the literature,[7] would seem to warrant further investigation.

Since the information regarding the *D. caninum* and *Spirocerca lupi* is indefinite and inconclusive, no totals are shown for them in table 1.

In view of the natural abode of *S. lupi*, hexylresorcinol could hardly be expected to effectively remove this parasite when administered orally.

The hookworms recovered after treatment were frequently extremely degenerated, a fact of paramount importance. It

is possible that the drug may be more potent than is indicated above, and a number of worms may have undergone autolysis to a point beyond recognition.

The experimental animals were carefully observed for signs of toxicity and none could be detected. For the 72-hour period that each animal was under observation, all appeared normal and some actually seemed to improve in condition after the initial expulsion of the intestinal parasites.

SUMMARY

A brief review of work dealing with hexylresorcinol as an anthelmintic has been presented. The results of the present study indicate that hexylresorcinol will remove 84.2 per cent of the Ancylostoma spp. and 98.1 per cent of the ascarids found in dogs, but it demonstrated no activity against *Trichuris vulpis* in this study. No signs of toxicity were detected.

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Gangrenous mastitis in sheep, due to *Staphylococcus aureus,* responded little to sulfonamides, but penicillin was curative. —*Vet Bull., Nov., 1953.*

Response of Dogs with Heat Exhaustion to ACTH or Cortisone

In my practice I have had occasion to treat many cases of heat exhaustion in dogs with the steroid hormones. The symptoms were rapid breathing, salivation, and hyperpyrexia (106 to 107 F.). Many were in a semicomatose state.

Within two to four hours after the administration, intramuscularly, of 100 mg. of cortisone or 40 units of ACTH in gelatin, breathing became normal, salivation ceased, and the temperature returned to normal.

The evidence indicates that in this syndrome of heat exhaustion, there is a depletion of the adrenocortical hormones due to an exhaustion of the adrenal glands; thus there is a severe disturbance of the heat-regulating mechanism.

In some cases, I used physiological saline solution and dextrose intravenously to combat shock, along with the steroids. However, I have found that on the steroids alone the results were just as good without the fluid therapy.—*Mervin G. Rhoades, D.V.M., Brooklyn, N. Y.*

Effect of Cortisone on the Therapeutic Efficacy of Antibiotics

Cortisone apparently enhances some infections in animals by depressing antimicrobial defenses rather than by promoting the invasiveness of the microörganisms. Therefore, antibiotics are often given with cortisone. To investigate this action, alternate groups of mice were given cortisone acetate, subcutaneously, for five consecutive days. Then, on the sixth day, they were injected with virulent *Klebsiella pneumoniae.* Six hours later all were treated with some antibiotic at various dose levels for four days.

At low levels, most of the mice in both groups died; at high levels, most of them lived. However, of those receiving intermediate doses of an antibiotic, fatalities were much greater in the mice which had received cortisone.—*Science, Nov. 6, 1953.*

A few drops of fluorescin applied to the eye will quickly reveal the extent of a corneal injury. And paracentesis, to reduce pressure of the anterior chamber, will prevent the rupture of a deep ulcer.—*W. G. Magrane, D.V.M., Indiana.*

Fibrosarcomas in a Deer

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In February, 1953, the Vermont Fish and Game Service presented a dead, mature doe for necropsy. The animal, which experienced difficulty in walking, was slipping on the ice and snow, and was finally shot by the game warden. She was in fair physical condition. Antemortem examination revealed multiple, spherical, fibrotic tumors attached to the superficial layers of the skin, involving the left surface of the head, both sides of the neck, the right shoulder area, the left ventral abdominal wall, and the tail. The tumors were especially numerous in the facial region, nearly obliterating the left eye. It was estimated that the total tumor tissue would have weighed approximately 25 lb.

Necropsy revealed the doe to have been about three months pregnant with twin fetuses. The ventral margin of the right lung presented two fibrotic growths about the size of marbles. All of the other viscera were apparently normal in gross appearance. Histopathological studies revealed these multiple tumors to be fibrosarcomas. An abundance of fibroblasts were present, arranged in an irregular pattern, and containing large, well-stained nuclei. There was evidence of active mitosis. The primary site of neoplasia was not determined. A diagnosis of fibrosarcoma tumors was made.

Fig. 1—The deer immediately before necropsy was performed. A portion of the largest tumor affecting the body surface can be seen attached to the shoulder area just posterior to the head and neck.

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Cornish Chickens Outyield Others.—The Institute of American Poultry Industries recently announced that of seven different breeds, strains, and crosses at 12 weeks of age, the Dark Cornish yielded the highest percentage of total edible meat and breast meat. The breast is the best single measurement for predicting the total edible meat in a 12-week-old chicken.

In some countries Newcastle disease is callel pseudofowlpest.—*S. M. Scheidy, V. M. D., Pennsylvania.*

Bloat in cattle may occur when the rumen somehow is made insensitive to pressures which would normally stimulate a reverse muscular wave and belching.—*R. W. Dougherty, D.V.M., New York.*

Field Trials with Streptomycin for Swine Dysentery

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DYSENTERY is a specific type of swine enteritis. It is also known as bloody scours, black scours, bloody diarrhea, flux, and hemorrhagic colitis. It usually affects growing pigs and shoats. It less frequently attacks breeding stock and may be transmitted from brood sows to their offspring. The symptoms are diarrhea, dehydration, sunken flanks, emaciation, and a general unthrifty appearance. The blood in the feces may be reddish or blackish. The feces also contain mucus. Mortality is extremely variable, ranging from almost no losses to as high as 50 per cent or more. Considerable economic loss results from the setback and weight losses suffered by the pigs, in addition to the mortality. The disease often recurs many times during the growing period. However, there is possibly some resistance acquired in some animals as a result of infection.

This study involved a total of 2,793 pigs on 11 farms. Treatment in each case was started after symptoms were seen. Considerable care was taken to make an accurate diagnosis in each herd. The establishment of control groups was not possible under farm conditions, hence the significance of the data depends on the large number of pigs used in the trials. No attempt was made to change the feeding or environment of any of the affected herds. As nearly as was possible, herds under observation and treatment were followed through to market weight in order to determine the efficiency of the treatment from the standpoint of protecting the pigs against setbacks in growth and development.

The material used was an impure mixture of streptomycin containing 36 to 60 per cent of the antibiotic. The material is readily soluble in water, hence most of the drug was given in the drinking water. Two herds were treated by mixing the drug in the feed, but the results were poor. In one herd, treatment was given by separating affected pigs from the herd, placing them in an isolation pen, and then treating them as a group. This method is economical, especially in a herd where only a small proportion of the pigs are affected.

Doses of streptomycin varied from 0.5 to 1.0 Gm. per pig per day and was usually given for two days. These doses were given by adding the required amount of streptomycin to a two-day water supply. In one herd, the dose was increased to 2 Gm. for two days in order to control a particularly obstinate recurrence.

RESULTS

The results of the trials are shown in table 1. The number of months that the herds were under observation refers to the time when they were first treated until they were marketed. In the case of farm 1, the pigs were affected when they were still with the sows. They contracted the disease from the sows which had been severely affected. Table 1 also shows the age at which the pigs were first affected. In some instances, this date may indicate an age younger than that at which the herd was first treated, since affected herds were not always called to our attention until some time after the disease first appeared. The average dose per pig refers to the average of two or more treatments. Where there was any substantial variation in the dose used, such as in farms 4 and 10, the range of dose is given. Farm 4 refers to a small group of pigs maintained by the veterinary department of Purdue University. Here, several different levels of streptomycin were used. On farm 10, a particularly obstinate recurrence of the disease required higher levels of streptomycin before symptoms disappeared.

Prophylactic treatments were administered on farms 1, 2, 3B, and 5, after an outbreak had occurred and the pigs had apparently recovered, in an attempt to prevent a recurrence. Some of these treatments were given when a few pigs were scouring in order to protect the rest of the

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herd. In this manner only, were any of the prophylactic treatments considered effective under the conditions of this trial. Sometimes outbreaks occurred soon after treatments were given, although no symptoms were observed at the time of treatment. Animals on farm 3 were divided into two groups, A and B. Farm 3 is a large garbage-feeding establishment. The remainder of the herds were on average-type farms.

In most cases, results were obtained with a dose of 0.5 to 1.0 Gm. of streptomycin per pig per day for two days. Within forty-eight hours, at least 95 per cent of the pigs in the herd were passing solid feces, their flanks were filled out, and the herd showed general improvement.

On farms 1, 2, 5, and 10, repeated treatments were required because of recurrences. The first treatment was followed in such cases by improvement, but additional treatments were given because some pigs showed symptoms later. However, in no case was there any important death loss after treatment was underway for a few days. On farm 1, four re-treatments were required, while on farms 2, 5, and 10, respectively, one, one, and four re-treatments were required before recovery occurred.

On farm 4, 2 Gm. of streptomycin per pig for two days was required to control a recurrence of the disease, although 0.5 Gm. for two days was effective in abating symptoms in the initial outbreak. This herd had been on sodium arsenilate for five days prior to treatment with streptomycin, and suffered a loss of 11 pigs on the fifth day after the arsenilate treatment was started. When given streptomycin, the symptoms soon disappeared. On farm 4, a single dose ranging from 0.25 to 2.0 Gm. was used in an attempt to determine the minimum effective levels of streptomycin. Results were somewhat ambiguous, but all the pigs eventually reached market weight.

On farm 3, the garbage-feeding establishment, group A was treated separately. Affected pigs were separated from the main herd and placed in an isolation pen for treatment. Streptomycin, 1 Gm. per pig per day, was added to the water in the isolation pen. The individual pigs were returned to the main herd as they recovered. An average of two days was required for each pig to recover. There were no recurrences in this group. The incidence of dysentery in group 3B was too high to make such a program practical, hence the entire herd was treated.

The total loss in all herds, comprising 2,793 swine, was 152 before treatment, while only 9 animals died after treatment was started. It is likely that the larger part of the animals that died after treatment was started did not have an opportunity to drink the medicated water, since 6 of the 9 died within twenty-four hours after the streptomycin was put in the drinking water. Of 3 pigs lost on farm 10, 1 died immediately after the initial treatment of the first outbreak, while 2 others died during a recurrence which did not stop until the dosage of streptomycin was raised to 2 Gm. per pig per day.

The available data on the market weights of the herds in this study indicated that the streptomycin treatment protected the pigs against any serious setback in growth, since they attained nor-

TABLE I—Streptomycin in the Treatment of Swine Dysentery

Farm	Pigs (No.)	Age first affected	Months observed	Gm. per pig per day	No. days given	Recurrences	No. treatments		Mortality		Market data	
							Therapeutic	Prophylactic	Before treatment	After treatment	Ave. wt. (lb.)	Ave. age (mo.)
1	473	3 weeks	6	0.5	2	5	10	4	32	2	227	
2	100	2 months	4½	0.67	2	3	5	3	24	2	197	
3A	550	6 months	3	1.0	2	0	1	0	0	0	Not available	
3B	740	6 months	2	0.5	2	3	4	1	2	0	Not available	
4	23	4 months	2	0.25-2.0	1	1	6	1	3	1	Not available	
5	325	2 months	3	0.6	2	1	3	4	29	0	223	6½
6	100	4 months	2	0.85	2	0	1	0	13	0	200	6
7	100	3 months	2	0.65	2	1	2	0	30	1	Not available	
8	155	3 months	2	0.5	2	0	1	0	8	0	220	5½
9	90	3 months	3	0.5	2	0	1	0	0	0	Over 200	5½
10	42	3 months	3	0.8-2.0	2	4	9	0	11	3	222	6
11	95	4 months	1	0.5	2	1	2	0	0	0	Not sold yet	
Average		.....	....	0.7	....	1.6	3.7	....	....	....	211	5.8
Total	2,793	.....	....	....	....	....	....	....	152	9	.....	.....

mal market weights within a reasonable time. The pigs on farm 1 averaged 227 lb. at 6 months of age, although they had dysentery before they were weaned and suffered five recurrences of the disease. Although market data was not obtained on all herds studied, the owners believed that the results compared favorably with previous crops of pigs raised under more favorable conditions. In all the herds marketed at this writing, the pigs reached an average weight of at least 200 lb. within six months.

Use of streptomycin in the feed on farms 1 and 2 neither prevented nor controlled outbreaks of dysentery. No further trials on medicated feeds were attempted, since the drinking water was much simpler to use and gave good results.

Discussion

From this study, it appears that streptomycin possesses considerable efficacy in controlling mortality and weight losses caused by swine dysentery. No treatment so far used entirely prevents recurrences, at least where the pigs are kept on the contaminated premises. Changing the ration of the pigs from whole corn and supplement to a ration such as ground feed, soaked oats, or buttermilk was not necessary in effecting temporary recovery. Separating and treating only affected pigs proved effective and economical in controlling the disease in one instance. This method obviates the necessity of treating large numbers of pigs when only a few are affected. Such a program also aids in reducing the spread of the disease in the herd. Moving apparently healthy pigs to clean ground following treatment might also prove of value in preventing recurrences of the disease.

Streptomycin mixed in feed was of doubtful prophylactic or therapeutic value under the conditions of this trial. Medicating the drinking water before symptoms were observed failed to prevent dysentery in limited trials. Such programs may prove of value in future trials. By using the drug in the drinking water as soon as symptoms appear, it is believed that death losses, loss in weight, and retarded growth may be significantly decreased.

Summary

1) A total of 2,793 swine in 11 herds were treated for swine dysentery with streptomycin. The dosages varied from 0.5 to 2.0 Gm. per pig per day for two days, with an average dose of 0.7 Gm. The antibiotic was most effective when given in the drinking water.

2) Streptomycin apparently significantly reduced mortality and weight losses caused by swine dysentery.

3) When used as a preventive, streptomycin failed to entirely prevent dysentery.

4) The treatments used did not prevent the recurrence of swine dysentery in all cases. However, re-treatment was followed by marked improvement in most instances.

Conclusion

The ability of streptomycin to reduce death losses and the stunting effect caused by swine dysentery would appear to justify its use in infected herds in order to decrease the economic loss resulting from the disease.

Swine Dysentery Can Be Controlled

In this issue (pp. 195-197), Dr. L. P. Doyle makes another of his important contributions to the understanding and control of swine dysentery. Now, therefore, is an opportune time to remember that this disease has always been peculiarly vulnerable to sanitary control measures. This is true since it is transmitted only by the ingestion of infective fecal material.

Its control by sanitation may be accomplished in various ways, some of which may be practical on some farms but not on others. When dysentery is diagnosed, the next step should be a survey of the premises to find uncontaminated quarters. Often, especially in late summer and fall, the problem is simplified by the availability of clean ground such as hay meadows, stubble fields, or cornfields, except when the hogs are large enough to break down the corn and the corn mature enough to be eaten. At all times, empty corncribs or other buildings with washable floors may be available.

One plan which has been proved effective when strictly followed includes: (1) careful selection and removal of all animals still not showing signs of dysentery; (2) confinement of these where they can be observed for a few days so that animals developing signs can be immediately re-

turned to the sick lot; (3) removal of all feed for twelve to twenty-four hours by allowing ample water, medicated or not as desired; (4) providing feed and water only in containers into which the pigs can insert neither their feet nor their bodies; (5) if confined on a floor, washing it clean at least twice daily but, if in a field or a clean pasture, confinement to a small area, with electric or other easily moved fence, so the healthy animals can be moved to an adjoining clean strip of ground whenever a new case is detected and removed; (6) providing a nutritious, easily digested ration such as buttermilk or alfalfa, but free of corn and heavy cereals. Also add at least a cupful of NaCl per bushel of feed.

Movable hog houses, when available, facilitate moving the herd but the floors, if any, and lower walls must be scrubbed before the house is again moved. Obviously the details in this plan will vary, depending on local conditions and the preferences of those in charge. It may require considerable persuasion to have this system put into use but it often is the most effective and also the most economical method for controlling swine dysentery. When this system is properly adapted, this statement also holds true for other sanitary diseases such as enteritis and coccidiosis in various species.—W. A. A.

Leptospirosis in Australia

Leptospirosis has continued to occur sporadically and enzoötically in many dairy herds in Australia. Swine were present on all but two affected farms and on one of the two, the disease was introduced by 32 calves which became ill shortly after they were purchased, 16 dying. One farm raised 50 calves annually in the same enclosure with infected pigs, yet, for seven years, symptoms appeared in only 1 or 2 calves each year, and in only 2 or 3 of the 140 cows. On another farm there had been no symptoms but when 2 cows showed hemoglobinurea, 26 of the 46 were found to have high agglutinin titers.

About 70 per cent of the 71 reactions were to *Leptospira pomona* only, about 20 per cent to *Leptospira mitis* only, and 9 per cent to both species. One positive case (calf) died showing little except violent cerebral symptoms. Apparently, many cases in adult cattle were so mild they escaped notice. Most of the cows effected showed icterus and some showed hemoglobinuria, abortion, or altered milk, but hemoglobinemia was always present. On one of these "red water" farms, the farmer and his son became infected, and a farmer's wife on another.

In 1950, a mare which aborted reacted to *L. pomona*. On 25 farms with bovine leptospirosis, 35 of the 58 horses reacted, while on 23 farms with no known leptospirosis, but where pigs were kept, 8 of 34 horses reacted. Of the 43 equine positives, most reacted to *L. pomona;* 6 reacted to *L. mitis;* and 2 to *Leptospira icterohaemorrhagiae*. Histories of illness were revealed for only 2 of the 43 horses: a mare having aborted, and a gelding having shown symptoms of meningitis, then gradually recovering. Horses, like swine, could be unsuspected reservoirs of infection. One reactor was blind but periodic ophthalmia had never been reported in this province.

Of 76 swine tested on 10 affected farms, 26 reacted to *L. pomona*, 22 to *L. mitis*, and 7 to both species. Urine from 21 positive pigs, when injected into guinea pigs, resulted in the isolation of *L. pomona* in 2 and *L. mitis* in 1.

Only 10 rats could be caught on infected farms and the serums of all failed to react to any of six Leptospira strains.—*Austral. Vet. J., Aug., 1953.*

Bovine Hyperkeratosis in Australia

A 4-month-old calf raised where there was an assortment of old building material, including leaking drums of sump oil, developed hyperkeratosis. Similar lesions were reported in 2 calves in an adjoining lot into which the oil could drain. This is the first case recorded in Australia.—*Austral. Vet. J., Sept., 1953.*

Saliva and urine tests are most satisfactory for detecting the "doping" of race horses. The animal usually accommodates by urinating soon after reaching the stall following a race. Saliva is secured with a dampened swab. Both samples are immediately sealed to prevent tampering.—*D. W. Crisman, V. M. D., Pennsylvania.*

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Fowlpox in the Mourning Dove

CHARLES W. KOSSACK and HAROLD C. HANSON, M.S.
Urbana, Illinois

MOST WILD birds are known to have a comparatively high annual mortality, but only a beginning has been made in wildlife research in accounting for the factors involved in these losses or evaluating their importance. A program of research on the mourning dove (*Zenaidura macroura*) which was initiated in 1948 by the Illinois Natural History Survey included a study of its diseases. These investigations have revealed that the species is subject to a fairly wide range of diseases and parasites. Our finding of pox in the mourning dove, apparently for the first time, furnishes an example of a potential cause of mortality among wild doves, the importance of which is as yet unknown.

CASE REPORTS

Five cases of fowlpox were observed, 4 in hunter-crippled and captive mourning doves and 1 in the exotic ring dove (*Streptopelia risoria*). Fowlpox is caused by a filterable virus, classified by Holmes[2] as *Borreliota avium*, of which there appear to be at least four strains.[1] For clinical confirmation of this virus disease, we are indebted to Dr. Joseph O. Alberts of the College of Veterinary Medicine, University of Illinois. Lacking confirmatory laboratory data, it might be assumed that the birds here reported upon were infected by the pigeon strain of the virus. According to Levi,[3] pigeon pox has been found in domestic pigeons from most sections of the country, although less commonly in the North Central states.

Case 1.—The initial case of fowlpox was found in a mourning dove that had been wounded in the Barrington, Ill., area and brought in by hunters for examination. This specimen had lesions typical of a primary phase of the disease in which the lesions are confined to the cutaneous areas of the head. This dove died within two days from gunshot wounds.

Case 2.—The second case of fowlpox was in another wounded bird that was held thirty days in quarantine and then placed in a cage with other captives. A month later, this bird exhibited a small, pea-sized nodule in front of the eye (fig. 1[A]). At this point the bird was isolated. Fifteen days later, five large nodules were observed on top of the head and swelling had developed around the eyes. The bird appeared distressed. As in the previous case, the manifestations of the disease were confined to external areas of the head.

Case 3.—The third case (fig. 1[B]) involved a juvenile female trapped at Barrington, Ill., and held captive for experimental studies. It also was held in quarantine for thirty days before being released in a cage containing other captives. Sixty days after being exposed to the bird cited as case 2, small nodules were observed on the top of the head of this bird and it was isolated. Five days later, additional nodules developed on the dorsum of the beak. A drop in food intake occurred, and two days later the bird stopped feeding. Forced feeding of pablum with a syringe was then begun, and five days later, when large nodules appeared on the head, treatment as described below was undertaken. Nine days after treatment, the head lesions dropped off leaving the bird bald. The nodules on the beak remained for another sixty-one days, after which this bird appeared to have fully recovered.

Case 4.—This case (fig. 1[C]) also involved an adult bird trapped at Barrington, Ill. A nodule developed on the dorsum of the beak several months after exposure to case 2. This nodule eventually dropped off and the bird recovered.

Case 5.—The fifth case of pox studied occurred in an albino ring dove (fig. 1[D]). The nodule on the lower eyelid of this dove was found sixty-four days after it had been exposed to the mourning dove cited as case 2. Treatment (*see* below) was begun eight days later. Eleven days after the lesion on the eyelid was detected, diamond-shaped lesions were found at the posterior part of the pharynx. The appearance of these diphtheria-like lesions in the pharynx constitute a secondary phase of bird pox infections.[1,3] In a technical bulletin issued by the War Department,[4] it is stated that pigeon diphtheria

From the Illinois Natural History Survey, Urbana.

and pigeon pox are but internal and external manifestations of the same disease. Forced feeding with pablum was begun when voluntary feeding stopped with the appearance of the pharyngeal lesions. Seven days after treatment, the nodule on the eyelid dropped off, but it required forty-five additional days for the pharynx to heal and the bird to resume normal feeding habits leading to a full recovery.

TREATMENT

Because of their value as experimental birds, considerable effort was made to save infected individuals and to keep losses among exposed birds to a minimum. Various treatments and remedies were applied as recommended by Levi[3] and Price.[5] Some of the remedies used included an ointment consisting of petroleum jelly and powdered sulfur to be applied on head nodules, iodine for beak nodules, and ophthalmic mercury oxide ointment for nodules on the eyelids. Sulmet, a sulfonamide preparation, was mixed in a ratio of 1 tablespoon of sulmet to ½ gallon of drinking water which was also fortified with 1 teaspoon of karo syrup to stimulate the appetite. The loss of appetite or inability to eat is one of the important aspects of this disease and one which may be the primary cause of mortalities. In an effort to prevent this virus from gaining epizoötic proportions and to safeguard the exposed flock, a vaccination program was employed. The vaccine used was of the pigeon pox type, a mild form of fowlpox vaccine. It was applied by removing four or five feathers on the thigh of the bird and rubbing the vaccine into the follicles with a brush. The immediate reaction of the flock was a 50 per cent drop in food consumption that continued for about ten days. In an effort to restore the food intake, both dry and hot mash was fed daily. Infested birds that did not eat voluntarily were force-fed pablum; this was accomplished by using a syringe, cannula, and rubber

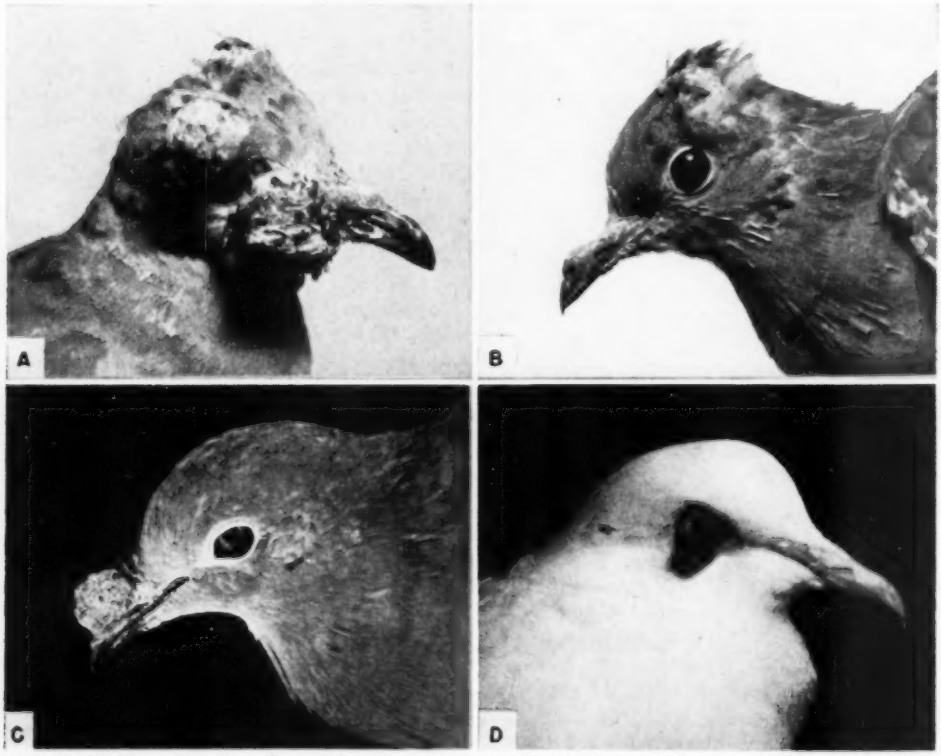

Fig. 1(A)—Mourning dove (case 2) with pea-sized nodule in front of the eye. (B) Mourning dove (case 3) with fowlpox. (C) Adult mourning dove with nodule on beak which developed after exposure to case 2. (D) Albino ring dove with nodule on the lower eyelid due to fowlpox.

tubing. Contrary to instructions for the use of the vaccine, known infected birds were also vaccinated without noticeable after-effects.

The recovery of the treated doves may have been coincidental. However, the events subsequent to the treatment are of interest: head nodules treated with the sulfur ointment dropped off within twenty-one days; nodules on the beak disappeared in seventy days after being treated with iodine; eyelid nodules dropped off within ten days after being treated with ophthalmic mercury oxide ointment. No additional outbreaks were observed after the flock was vaccinated. Eight days after applying the vaccine, 10 birds were examined with 8 indicating a "take."

SUMMARY

Symptoms of fowlpox were found in 2 mourning doves crippled by hunters near Barrington, Ill. One of these doves survived and was placed in a cage with other captives. Despite the precaution of a thirty-day quarantine, the disease spread to 2 other captive mourning doves and a ring dove.

Nodules were observed about sixty days after a bird was exposed to the infection. They reached their peak of development in about eleven to fourteen days and disappeared in about twenty-one days. Our observations indicated that in severe, untreated cases, death probably occurs more often as a result of starvation than of the direct effect of the lesions.

Vaccination of the exposed flock seemed to stop further spread of the disease but caused a 50 per cent drop in food intake for about ten days.

As it is impossible at this time to assess the relation of this disease to wild mourning dove populations, it is urged that wildlife investigators be on the lookout for infected individuals so that the distribution and importance of the disease can be determined.

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Indigestion from Sand in the Abomasum

A thin, 4-year-old Guernsey cow, with a good appetite and on a special diet, was negative to all tests for wasting diseases. The abdomen always appeared full and external palpation indicated a normal rumen content. On necropsy, the abomasum was on the floor of the abdomen, displacing and almost equal in size to the rumen. When incised, a large quantity of gray fluid, a mixture of watery food and sand, escaped. The mucosal folds, packed with approximately 2 inches of sand, appeared normal when washed. The rumen, reticulum, and omasum were practically normal. When dried, the sand weighed 10 lb. The cow had grazed where the soil was sandy but no other animals in the herd had shown symptoms.—*Vet. Rec., Nov. 7, 1953.*

Antibody Source Is Proved

The first positive identification of tissues which form antibodies was recently reported. Mice immunized with tetanus toxoid were given sublethal *gamma* radiation to destroy their ability to produce antibodies. Various tissues were then transplanted into the anterior chamber of their eyes, which would be the only source of new antibody formation. Spleen and lymph node transplants produced antibodies in response to intravenous injections of more tetanus toxoid. Research continues with other tissues.—*Science, Dec. 11, 1953.*

In some European countries, where tuberculosis is still quite prevalent, BCG vaccine is being used experimentally to protect cattle against it.—*M. P. Kaplan, V. M. D. (WHO), Switzerland.*

Turkey Reports Fowl Leukosis.—The first occurrence of fowl leukosis was recorded in Turkey in 1952. This lymphomatosis was revealed in 12 of 14 birds examined in one flock. Massive accumulations of lymphoid cells occurred chiefly in the livers, kidneys, and spleens.—*Vet. Bull., Dec., 1953.*

Canine Histoplasmosis and Blastomycosis in Lexington, Kentucky

ROBERT W. MENGES, D.V.M.; JAMES T. McCLELLAN, M.D.;
ROBERT J. AUSHERMAN, D.V.M.

Lexington, Kentucky

THE ANIMAL diseases that can aid most in the understanding of human diseases are those that involve both animals and man. Included among these are the systemic fungous infections, histoplasmosis and blastomycosis. This paper describes epizoötics of histoplasmosis that have occurred among dogs in Lexington, Ky., during the period 1947 to 1953. The epizoötics have been studied in detail with respect to the age, sex, breed, and distribution of cases. In addition, isolated cases of human and canine histoplasmosis and blastomycosis are mentioned. Evidence that histoplasmosis may occur in an epizoötic form among dogs of the same litter has been presented by Robinson *et al.*[1] and Menges.[2]

The distribution of the proved and suspected canine and human cases of histoplasmosis and blastomycosis, and areas where *Histoplasma capsulatum* was isolated from soil, are shown in figure 1.

HISTOPLASMOSIS

Epizoötic in Boxers.—This epizoötic, which has been mentioned by Runnells,[3] is reported in detail here. In August, 1946, the owner (C.B.) purchased a 4-month-old female Boxer pup from a kennel in Louisville, Ky. The pup was raised at location A (fig. 1) in Lexington. When 1 year old, she was taken to Chicago and bred. In her first litter, born May 20, 1947, she had 9 pups, 3 females and 6 males. One male pup died at 1 week and another at 6 weeks of age. One female consumed rat poison and died. Later, 2 more pups died, a female at 6 months of age (case 1, suspect) and a male at 10 months of age (case 2, suspect).

In May, 1948, the owner moved to location B (fig. 1) in Lexington, also moving the dam and the 4 remaining pups. Just prior to moving, 2 males (cases 3 and 4, suspect) became sick. Both were sick two months, showing loss of weight, loss of appetite, and jaundice; and both died in July, 1948, at 14 months of age. The remaining male and female were still normal in May, 1952. The female was given to a person in the southeastern section of Lexington. Some time later, she was bred and had a litter of normal pups.

The dam had her second litter, 5 females and 1 male, in October, 1948, at location B (fig. 1) in Lexington. All were alive in May, 1952, and none had been sick.

The dam first showed signs of illness in April, 1949, when she was 3 years of age (case 5, proved). The owner noticed that her mucous membranes were yellow and, as the disease progressed, ascites developed and loss of weight was quite evident. She died late in June, 1949, and an autopsy was performed at the Department of Animal Pathology, University of Kentucky.[4] The liver was greatly enlarged and contained many necrotic foci; the mesenteric lymph nodes were greatly enlarged; the abdominal cavity contained straw-colored fluid; and there were several abscesses in the lungs. Sections of tissues from this bitch were examined one year later and found to be positive for *H. capsulatum.*

Although no definite proof could be obtained concerning all of her litter, 4 of the pups and the dam showed clinical symptoms of histoplasmosis.

Case 23, a 26-month-old female Boxer, which had histoplasmosis in September, 1951, resided one block north of location A (fig. 1) on the same street. *Histoplasma capsulatum* was isolated, and demonstrated in her tissues.

Epizoötic in Cocker Spaniels.—This epizoötic, also mentioned by Runnells,[3] is reported in detail here. In 1946, the owner (H.W.) purchased a 3-month-old female Cocker Spaniel from a kennel in New Jersey. The pup was raised at location C (fig. 1) in Lexington. Early in 1948, at 2 years of age, the bitch was sent by plane to California for breeding. A second trip was necessary before she conceived.

From the Communicable Disease Center, Public Health Service, U. S. Department of Health, Education, and Welfare, Kansas City, Kan.; and the Lexington Clinic and Del-Tor Clinic, Lexington, Ky.

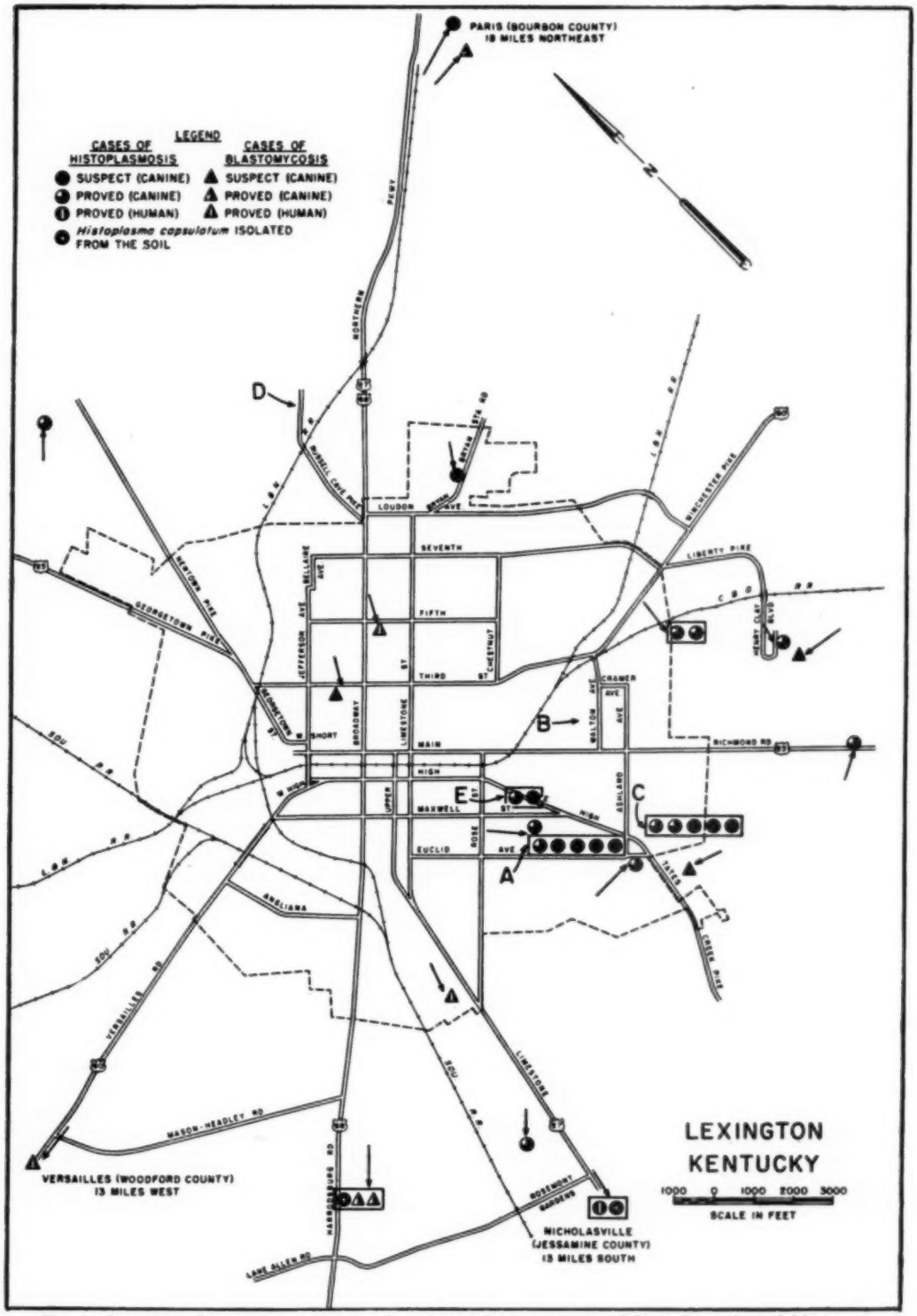

Fig. 1—Location of proved and suspected canine and human cases of histoplasmosis and blastomycosis, and areas where Histoplasma capsulatum was isolated from the soil. (Cases 20 and 28 are not shown on the map because the Lexington address was not known.)

In her first and only litter, born in August, 1948, she had 6 pups, 4 males and 2 females. The pups were kept at home for about 4 months, then all but 1 were given to friends. Two of the males died in September, 1949, at 13 months of age (cases 6 and 7, proved). Sections of tissue from these dogs were found positive for *H. capsulatum* by Runnells.[3] Another male (case 8, suspect), the 1 kept by the owner, became sick at about the same time. It had a persistent diarrhea and weight loss. It was taken to a clinic in Lexington where a clinical diagnosis of histoplasmosis was made. The dog appeared to be recovering from the illness when it was killed in an automobile accident. No autopsy was performed.

Two others of this litter developed a persistent diarrhea and showed loss of weight before they died. One was a male (case 9, suspect) which died in November, 1949, at 15 months of age. The other was a female (case 10, suspect) which died in December, 1949, at 16 months of age. No data could be obtained concerning the remaining female.

In this litter of 6 pups, at least 5 showed symptoms of histoplasmosis. Two of the cases were proved by microscopic demonstration of the organisms in tissues.

The dam was given to a new owner after the deaths occurred. She was still alive in May, 1952, but she had no more pups.

Epizoötic in Dachshunds.—This epizoötic concerns two litters of Dachshund pups. The first litter of 2 males and 3 females was born on a farm (J.M.) at location D (fig. 1), northwest of Lexington, on Feb. 12, 1950. The dam developed skin lesions around the muzzle but recovered. She was still alive in May, 1952. One male pup was sold in Indiana. The other male pup became sick in August, 1950, at 6 months of age. It showed a loss of weight and developed a swelling of the right thorax, a subcutaneous abscess. A radiograph showed a widening of a rib, so sarcoma of the rib was suspected. A biopsy was performed and, the day after, an orange pus exuded from the wound. Microscopic examination of the biopsy tissue showed inflammation and necrosis. An empyema developed and the wound drained for some time before it healed. The dog finally recovered and was still alive in May, 1952. This was the second case of this type that had occurred on the farm, a male from another litter having shown similar symptoms in June, 1949. It also had recovered. A definite diagnosis was not established for these cases.

Two of the females were sold in Lexington. One died in April, 1952, at 2 years of age. She was pregnant at the time of death. Sections of her tissues did not indicate that she died of histoplasmosis. In August, 1950, at 6 months of age, the other female developed a chronic cough that persisted for one and one-half years. She was skin-tested in May, 1952, with histoplasmin lot H(KC) 3 and 4, diluted 1:10, and the test was negative. At that time she appeared normal. A definite diagnosis of histoplasmosis was not established for any of the pups in that first litter.

The remaining female in the first litter was sold to R.S. at location E (fig. 1) in Lexington. Prior to obtaining this female, this owner had bred Pointers. In 1948, 1 of his Pointer females had a litter of 9 pups, 6 of which died. In September, 1951, the Dachshund female was bred to a Dachshund from Lexington. In her first litter, born Nov. 15, 1951, there were 5 male pups. When they were 6 weeks old, 1 was given to the owner of the sire. This pup was alive and normal in May, 1952. The second pup was sold, at 6 weeks of age, to a person in Stanton, Ky. The third became sick and died at 2 months of age but no definite history could be obtained. The fourth pup (case 11, suspect) became inactive at 2 months of age; its head was swollen and there was a persistent diarrhea. Euthanasia was performed early in January, 1952. The fifth pup (case 12, proved) died of histoplasmosis late in January, 1952, at 2½ months of age. Sections of tissues from this dog were found positive for *H. capsulatum*. In this litter of 5 pups, 2 showed clinical symptoms of histoplasmosis, and 1 was proved, by microscopic demonstration of the organisms in tissues, to have the disease.

In addition to the 12 (4 proved, 8 suspect) cases of canine histoplasmosis which were associated with these three epizoötics, 11 (9 proved, 2 suspect) canine cases and 1 (proved) human case[5,6] also occurred in

Lexington. Data concerning the 24 cases are presented in table 1.

All the cases of canine histoplasmosis mentioned thus far were from one veterinary clinic. Recently, another veterinarian in Lexington reported that he has observed at least 10 cases (2 proved, 8 suspect) of canine histoplasmosis.[8] The 2 proved cases were reported by Runnells.[3] The first of the proved cases was a Pekingese from Georgetown, Ky. The owner of the dog obtained another Pekingese, and this dog also had clinical symptoms of histoplasmosis in April, 1952. The diagnosis was not confirmed.

The findings in Lexington are of interest when contrasted with those reported by Robinson and Kotcher[9] for Louisville, Ky. They cultured tissues from 303 dogs collected in the Louisville area and failed to isolate *H. capsulatum* from any. It does not seem probable that the Louisville area, only approximately 80 miles west of Lexington, could be entirely free of the disease. Differences in the results are probably due to the fact that all of the proved cases in Lexington occurred among sick animals, whereas the Louisville cultures were done on healthy animals.

BLASTOMYCOSIS

As the numerous cases of canine histoplasmosis were observed, an occasional canine case was seen that seemed not quite typical of histoplasmosis. These animals developed a chronic cough and radiographs showed an enlargement at the bifurcation of the trachea. Autopsies on a few of these dogs indicated that the disease was blastomycosis. Seven canine (4 proved, 3 suspect) and 3 human (proved) cases of blastomycosis have been observed in Lexington. Data concerning the 10 cases are also presented in table 1.

While the chronic cough and the enlargement at the bifurcation of the trachea were the most constant findings, fever, loss of weight, and diarrhea were also observed in a few of the dogs, and 2 of them had skin lesions. In all the cases of canine blastomycosis that were autopsied, lung lesions were observed. The differences in the gross pathology of the lungs of cases with canine histoplasmosis and those with blastomycosis were interesting. In all the histoplasmosis cases autopsied, there were fine, miliary-type lesions in the lungs. In contrast, the blastomycosis cases showed nodular-type lung lesions; in addition, in every instance there was a mass at the bifurcation of the trachea (enlarged lymph glands). This mass caused difficult breathing and the chronic cough.

There was no evidence to indicate that epizoötics of canine blastomycosis occurred. Two proved cases, however, did occur at the same location. A 4½-year-old male Cocker Spaniel (case 26) became sick late in 1950 and euthanasia was performed in December, 1951. This dog was kept in a garage in the southern section of Lexington. The second dog, a male Dalmatian pup (case 27), was obtained three or four months before the Cocker Spaniel was killed. This dog died on Feb. 22, 1953, at 1½ years of age. Blastomycosis was not suspected but, when histopatho-

TABLE 1—Proved and Suspected Cases of Canine and Human Histoplasmosis and Blastomycosis in Lexington, Ky., and Vicinity

Case No.	Yr.	Breed or Race	Age	Sex	Diagnosis: Clinical	culture	pathology
		CANINE HISTOPLASMOSIS					
1	1947	Boxer	6 mo.	F	+	*	*
2	1948	Boxer	10 mo.	M	+	*	*
3	1948	Boxer	14 mo.	M	+	*	*
4	1948	Boxer	14 mo.	M	+	*	*
5	1949	Boxer	3 yr.	F	+	*	+
6	1949	Cocker Spaniel	13 mo.	M	+	*	+
7	1949	Cocker Spaniel	13 mo.	M	+	*	+
8	1949	Cocker Spaniel	14 mo.	M	+	*	*
9	1949	Cocker Spaniel	15 mo.	M	+	*	*
10	1949	Cocker Spaniel	16 mo.	F	+	*	*
11	1952	Dachshund	2 mo.	M	+	*	*
12	1952	Dachshund	2½ mo.	M	+	*	+
13	1951	Doberman Pinscher	9 mo.	M	+	*	+[1]
14	?	? (7)	?	?	+	*	+
15	1949	Cocker Spaniel (5)	1½ yr.	F	+	+	+
16	1950	Cocker Spaniel	3 yr.	M	+	+	+
17	1950	Boxer	1½ yr.	M	+	*	+
18	1951	English Bull (cross)	2 yr.	F	+	*	+
19	1951	Cocker Spaniel	2 yr.	F	+	*	+
20	1951	Cocker Spaniel	1 yr.	M	+	*	+
21	1951	Boxer	2 yr.	M	+	*	*
22	1951	Cocker Spaniel	15 mo.	M	+	*	*
23	1951	Boxer	26 mo.	F	+	+	+
		HUMAN HISTOPLASMOSIS					
24	1949	White (B.D.)	3 mo.	F	+	+	+
		CANINE BLASTOMYCOSIS					
25	1950	Gr. Shep. (cross)	2 yr.	M	+	*	+
26	1950	Cocker Spaniel	4½ yr.	M	+	*	+
27	1953	Dalmatian	1½ yr.	M	+	*	+[2]
28	1951	Pekingese	2 yr.	?	+	*	+
29	1950	Cocker Spaniel	3 yr.	M	+	*	*[3]
30	1951	Gr. Shep. (cross)	1 yr.	M	+	*	*
31	1951	Pointer	2 yr.	M	+	*	*
		HUMAN BLASTOMYCOSIS					
32	1951	Negro (J.B.)	44 yr.	M	+	*	+
33	1951	White (W.W.)	63 yr.	M	+	*	+
34	1951	White (D.H.)	50 yr.	F	+	+	*

*Clinical culture not made [1]Blood; [2]also positive for histoplasmosis; [3]positive serology.

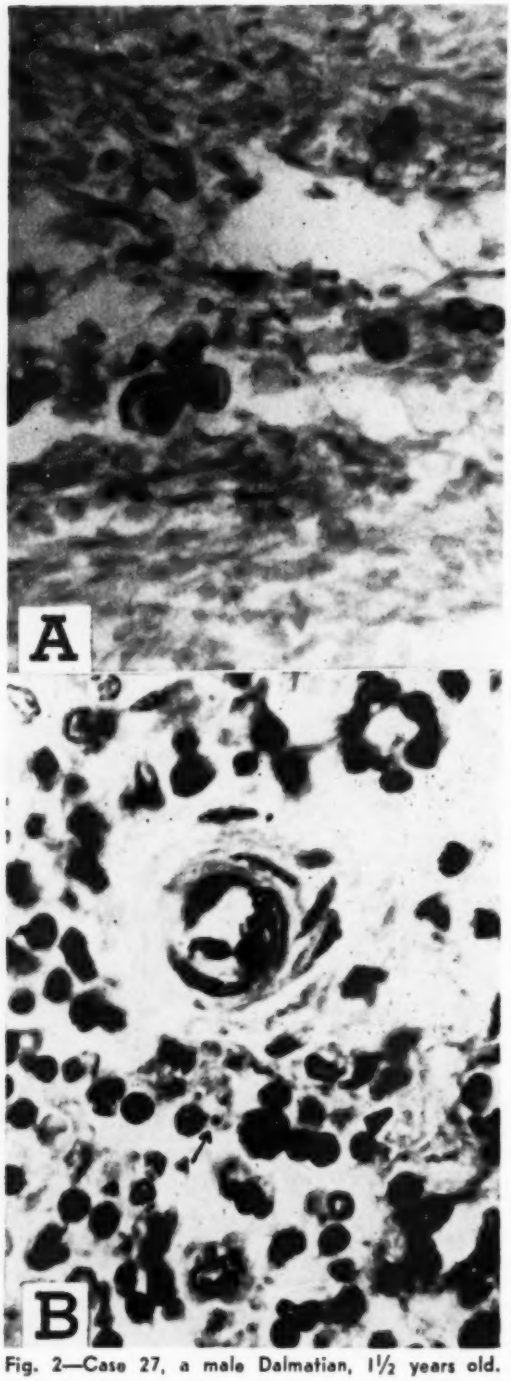

Fig. 2—Case 27, a male Dalmatian, 1½ years old.

(A) Blastomyces dermatitidis organisms in a necrotic lymph gland near the bifurcation of the trachea (Hotchkiss-McManus stain). x 670.

(B) Histoplasma capsulatum organisms in a lymph gland (hematoxylin and eosin stain). x 1050.

logical studies were made, many organisms were found in a necrotic lymph node near the bifurcation of the trachea (fig. 2[A]). Several other lymph nodes from different parts of the body were infected with *H. capsulatum* as well (fig. 2[B]). This is the first case of double infection that has been observed,* and it appeared that blastomycosis was the predominant infection. *Histoplasma capsulatum* was isolated from soil at the home where this dog was kept.

The 3 cases of suspected canine blastomycosis had the same typical symptoms as the proved cases. The male Cocker Spaniel (case 29), which was observed over a two-year period, became ill in October, 1950, at 1 year of age. It showed loss of weight, loss of appetite, progressive weakness, and had a chronic cough. In February, 1951, a large mass was detected at the bifurcation of the trachea. In July, 1951, leptospirosis was suspected. At this time, the dog developed a persistent diarrhea but improved after treatment with penicillin for two weeks. On May 19, 1952, the dog still had a harsh chronic cough and was quite thin. A blood specimen was obtained and the complement-fixation test for blastomycosis was positive 1:64, and the test for histoplasmosis was positive 1:8. In October, 1952, the dog appeared to have recovered from the illness.

The 3 cases of blastomycosis in man were all proved cases. Two were proved by microscopic demonstration of *Blastomyces dermatitidis* in tissues at autopsy, and the fungus was isolated from sputum of the third (case 34).

ISOLATIONS FROM SOIL

In March and in May, 1952, 41 samples of soil were collected from areas where human and canine cases of histoplasmosis and blastomycosis occurred in Lexington and vicinity. *Histoplasma capsulatum* was isolated from 2 of the 41 samples. The method used for isolation has been described by Larsh *et al.*[10] One isolation was made from soil from inside a farm chicken coop. A 3-month-old infant (case 24) died of histoplasmosis on this farm.[5,6] The second isolation was from soil near the garage where the 2 proved cases of canine blastomycosis (cases 26 and 27) had been

*Since this article was written a human case of dual infection has been reported by Layton et al. in Am. J. Clin. Path., 23, (Sept., 1953): 904-913.

housed. (Case 27 was also infected with *H. capsulatum*, although blastomycosis was the predominant infection.)

DISCUSSION

Isolated cases of canine histoplasmosis occurred throughout Lexington, and three epizoötics occurred among litters of pups. In another instance, 2 cases (14 and 15) occurred at the same location. In one area, in eastern Lexington, within a radius of 1 mile, 18 canine cases (10 proved) occurred, including the three epizoötics. Three breeds of dogs were involved in the histoplasmosis epizoötics: Boxer, Cocker Spaniel, and Dachshund. There were 20 pups in the three litters and 11 cases (55%) of histoplasmosis (3 proved, 8 suspect). In addition, the dam of the Boxer pups had histoplasmosis (proved). Among the 20 pups, there were 15 males and 5 females. Nine cases (3 proved, 6 suspect) occurred among the 15 males, and 2 cases (suspect) among the 5 females.

The 10 cases of blastomycosis, 3 human and 7 canine, occurred as isolated cases (fig. 1). There was no evidence that the human cases obtained their infection from animals. Two of the canine cases (26 and 27) occurred at the same location.

The 7 cases of canine blastomycosis were among older dogs, the oldest being 4½ years old: 6 were males and the sex of 1 was not known. Five breeds of dogs were involved: Cocker Spaniel, Dalmatian, Pekingese, German Shepherd, and Pointer.

Natural *H. capsulatum* infection probably occurs by inhalation. The fungus grows in the soil during damp, humid seasons, then drys in hot seasons, and finally is disseminated by winds, resulting in airborne infection. It also seems possible that *B. dermatitidis* could exist in nature and that the infection could be acquired by inhalation. The dogs all had pulmonary lesions, those referred to in the literature having extensive pulmonary lesions.[11]

SUMMARY

Epizoötics of canine histoplasmosis that occurred in Lexington, Ky., during 1947 to 1953 have been described. Among 20 pups in three litters, 11 proved and suspected cases occurred. There was 1 additional case associated with the epizoötics and, of the 12 cases, 4 were proved by microscopic demonstration of *Histoplasma capsulatum* in the tissues.

The distribution of human and canine cases of both histoplasmosis and blastomycosis in Lexington has also been presented. The total of 34 cases included: 23 canine histoplasmosis (13 proved); 1 human histoplasmosis (proved); 7 canine blastomycosis (4 proved); and 3 human blastomycosis (proved).

H. capsulatum was isolated from 2 of 41 soil samples collected from Lexington and vicinity.

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Histoplasma Capsulatum from Air

Several cases of histoplasmosis occurred in a farm family in Kansas following the cleaning of an unused chicken house. Another case occurred after cleaning out a chicken house in Missouri. In 13 samples of the air in these chicken houses, while the debris on the floor was not disturbed, *Histoplasma capsulatum* was captured five times. The organism was readily isolated from the debris on the floor and from the soil just outside the chicken houses.—*Science, Jan. 8, 1954.*

The Nature of Corneal Pigmentation in the Dog

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FREQUENT reports[1-3] of corneal pigmentation in the dog attest to its importance, yet the etiology and pathology of this disease have received little attention. While statistics are lacking, the writer believes that corneal pigmentation causes more blindness than any condition, excluding cataracts. This paper reports the results of an investigation of the etiology and pathology of corneal pigmentation in the dog, with some remarks about popular therapy.

CLINICAL APPEARANCE

The normal cornea of the dog is perfectly transparent. While some pigment is usually apparent at the limbus, there is no extension of pigment into the normal cornea.

In the pigmented cornea, the first changes are usually observed on the corneal side of the limbus where dark brown or black plaques appear to lie in the superficial stroma or in the epithelium. Early lesions are small and discrete with irregular borders. Later, they may coalesce and the cornea becomes infiltrated with pigment which effectively obscures vision. The cornea is then dry and irregular and symptoms of conjunctival discharge and blepharospasm may appear. Vascularization accompanies pigment deposit and trunk vessels may be seen to arise in the bulbar conjunctiva and branch in the corneal stroma.

There are cases in which a small area of pigment is present in the periphery of the cornea which remains symptomless. In others, pigment covers the entire cornea and is accompanied by severe signs of local inflammation. All grades of pigmentation are seen between these extremes. While pigment usually arises at the limbus, an occasional case is observed where a pigment island is found at some distance from the limbus with clear cornea between.

DATA ON CORNEAL PIGMENTATION

Breed Susceptibility.—Corneal pigmentation appears most commonly in breeds with large, prominent eyes such as Boxers, Boston Terriers, and Pekingese. No breed seems to be immune, however, and occasional cases are encountered in Collies and Wire-Haired Fox Terriers which have small, deeply recessed eyes.

Bilaterality.—While one eye may be pigmented and the other normal, bilaterality is the general rule. When both eyes are affected, the pigmentation is usually symmetrical. It has been observed[1] that unilaterality is more common in young subjects, bilaterality in the aged.

Role of Natural Pigmentation.—Dogs with dark conjunctival pigmentation are prone to develop corneal pigment under certain conditions of stress. In many of these cases, the corneal and conjunctival pigmentation appear to be continuous.

Corneal Pigmentation in Other Species.—I have seen one case of corneal pigmentation in a cat and two cases have been reported by others.[4] Melanin pigmentation of the cornea does not occur in man, although pigment deposits from iron, silver, blood, and degenerative processes are not uncommon.

LITERATURE

Magrane[1] has reported success in treating pigmentation of the cornea with x rays. By using a unit calibrated for superficial therapy, he reported good results in a series of 15 cases. In all cases, pigmentation was either dissolved or arrested. In a later report,[5] he found that there were some relapses with reappearance of pigmentation in irradiated eyes. He concludes that x-ray therapy has some value in cases receiving early treatment.

Candlin and Levine[2] reported good results in radiation therapy of chronically diseased corneas with the *beta* applicator, a source of *beta* rays. Some of these cases had pigmented corneas, but the fate of the pigment is not recorded. In a personal communication,[6] Candlin reported that the density of corneal pigmentation was reduced by the *beta* applicator.

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The author expresses his appreciation to the staff of the Stanford University Department of Ophthalmology for the many microscopic preparations; to Dr. G. W. Van Alphen for his aid and advice; to Dr. Raymond Michler who examined many specimens; and particularly to Dr. A. E. Maumenee, professor of ophthalmology, who made the facilities of his department available to me. He also thanks Mina Chern, bacteriologist for the State of California Department of Health, for classification of fungi.

Fig. 1—Section of normal cornea. x 50.

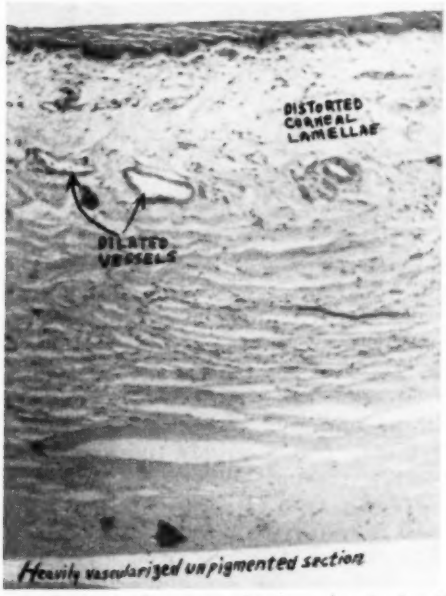

Fig. 2—Section of cornea showing chronic keratitis with heavy vascularization—unpigmented. x 50.

Fig. 3—Pigment deposits in the superficial third of the cornea. x 50.

Fig. 4—Corneal section with superficial pigmentation accompanied by deep stromal pigmentation. x 50.

On the other hand, Catcott[7] found that pigment was not reduced, although *beta* rays may have exerted a stabilizing effect so that pigmentation was arrested or delayed.

Phillips[8] believes that pigmentation of the cornea is caused by a fungous infection. He suggests that thymol iodide and iodine in oil be applied to the cornea and reports good results with this method. Others advocate topical cortisone[9] and chloramphenicol[10] but record inconclusive results and make no mention of the fate of the corneal pigment.

METHODS

In order to determine the microscopic pathology of corneal pigmentation, a series of 21 pigmented dog eyes were collected and fixed in 10 per cent formalin. The tissues were then imbedded in nitrocellulose, sectioned, and stained with hematoxylin-eosin. Four normal dog eyes were prepared by the same method and all were examined microscopically.

To determine the role of fungi in causing corneal pigmentation, 10 pigmented corneas were scraped and innoculated on suitable mediums. The

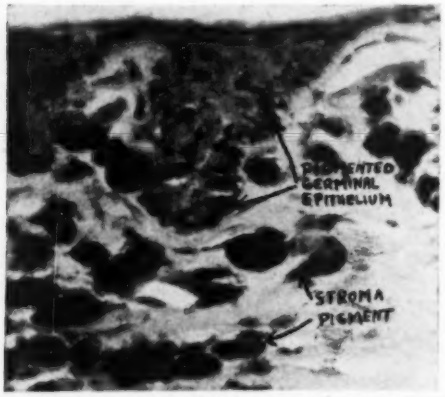

Fig. 5—Section of superficial cornea showing pigment granules in the germinal layer of the epithelium and pigment clumps in the stroma. x 200.

cultures were examined and classified by a qualified mycologist. Simultaneously, a series of 5 cases were treated according to the Phillips' method. Two sections were stained with Giemsa to demonstrate the presence of fungi. While the staining qualities of the pigment resembled melanin, it was deemed essential to assure its identity. To differentiate the pigment from blood staining, two sections were stained to demonstrate the presence of iron. Melanin bleach and Bodian's stains were undertaken on other sections to further identify the pigment.

From these methods, it was hoped that the following questions could be answered:

1) What tissues give rise to, or originate, the pigment?
2) What is the identity of the pigment?

Fig. 6—Pigmented cornea of a Pekingese. There are heavy plaques of pigment at the nasal side of the cornea.

3) What is the role of blood vessels in pigment development?
4) Are fungi implicated etiologically?
5) Can the variable results of x-ray and *beta*-ray treatment of the cornea be explained with this additional information?

MICROSCOPIC PATHOLOGY

While the sections differ in degree and position of pigment, a definite pattern can be described as a common characteristic. All sections show varying degrees of subacute or chronic keratoconjunctivitis, usually of a superficial stromal variety. The corneal epithelium, especially the basal cell layer, contains granular pigment which decreases in density toward the superficial layers. This basal cell pigmentation is present in every case of superficial pigmentation. There is a definite papilliform epithelial downgrowth in the majority of sections. Bowman's membrane is irregular and may be absent. Below this membrane, scattered throughout the superficial stroma, are spindle-shaped cells containing granular pigment.

Blood vessels and inflammatory cells are seen in the superficial third of the cornea. Plasma cells and macrophages predominate, in some sections, polymorphonuclear leukocytes in others. Lymphocytes are rarely observed and no pigment cells are found in the vessel walls. The corneal-lamellae are irregular and, in some sections, facets may be seen on the corneal surface.

In cases where there has been peripheral anterior synechiae, either from glaucoma or following surgical procedures, the iris pigment may invade the deep corneal stroma, crossing Descemet's membrane. Superficial corneal pigmentation is observed in some but not all of such cases.

Fungi were cultured from all innoculations with corneal scrapings. It was possible to classify four Aspergillus, two Cephalosporium, two Verticillium, one Stemphylinon and one member of the family Demaciaceal, order Moniliales, class *Fungi imperfecti*.

Of 5 cases treated according to Phillips' method, none showed any measurable improvement.

Sections stained with Giemsa failed to demonstrate the presence of fungi.

Iron stains, melanin bleach, and Bodian's stains indicate that practically all pigment in the corneas was melanin. A not unexpected finding was small amounts of hemo-

siderin demonstrated in one heavily vascularized section.

DISCUSSION

From a study of stained sections, it appears that superficial corneal pigmentation originates in the germinal epithelium. This tissue has the same embryological origin as that of the conjunctiva. It has been postulated that the germinal epithelium, like the skin cells of Langerhans', are potential melanoblasts which can take up melanin under conditions of stress. Tanning of the skin under solar stimulation is a familiar example of melanization. From the point of origin in the germinal epithelium, the pigment granules aggregate and drop off to lie in the superficial stroma. Smaller granules are also found superficial to the germinal layer in the epithelium.

Vascularization is invariably found in pigmented corneas but whether it precedes pigment development is not clear. Many cases of vascularized corneas show no tendency to pigment deposit. Pigment in the deep layers of the stroma, without superficial involvement, apparently arises from the uveal tract. This is illustrated by migration of pigment from the iris into the corneal stroma in cases of peripheral anterior synechiae.

As has been suggested, the extension of pigment from the limbus probably occurs in some cases. In others, there is a discrete pigment zone at some distance from the limbus with clear intervening cornea. This suggests that the germinal epithelium, rather than limbal pigment, produces corneal pigmentation.

All cultured fungi were of types commonly found on any animal tissue. They were not considered to be pathogenic except in actual tissue invasion. Fungi were not found in stained sections.

Reports of therapeutic radiation of pigmented dog corneas have been reviewed but it is difficult to evaluate the results of the limited clinical trials. Two reports on the use of the *beta* applicator are distinctly at variance with each other. Uniformity of dosage and technique and the careful selection of patients would be expected to give more uniform results. It is presumed that cases with deep, as well as superficial, pigmentation would be more refractory to treatment than cases with purely superficial involvement. *Beta*-ray treatment is probably a more promising line of investigation than x rays. The single favorable report of x rays must be qualified by the later relapse of some cases.

Cortisone may arrest or suppress neovascularization of the cornea if treatment is initiated early.

Combination of radiation, cortisone, and cautery of trunk vessels appears to offer the best hope for further clinical trials at this time.

CONCLUSIONS

The pigment in diseased dog corneas has been identified as melanin. Pigmentation of the superficial cornea originates in the germinal epithelium and, to a limited extent, from the limbus. Pigmentation of the deep corneal stroma, in the absence of superficial pigmentation, originates in the uveal tract. No support was found for the theory that corneal pigment is caused by fungi.

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Evaluating Ophthalmic Ointments

Ophthalmic ointments are sometimes condemned for use on corneal abrasions because the antiseptic and anesthetic contents tend to retard healing. An authority, agreeing that they should be used sparingly, recommends antiseptic ointments when indicated but, for anesthetic effect, prefers systemic analgesics instead of local anesthetics.—*J. Am. M. A., Dec. 12, 1953.*

Nitrophenide and Other Anticoccidial Studies with Dogs

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NITROPHENIDE (m,m'dinitrodiphenyl disulfide) is an anticoccidial compound added to poultry feeds to control cecal and intestinal coccidiosis caused by *Eimeria tenella* and *Eimeria necatrix*. In 1951, Elsasser, Grundish, and Ralston[1] reported 20 cases of poisoning in dogs due to a dry cereal-type dog food contaminated with nitrophenide.

During the late fall of 1952, an outbreak of an unfamiliar nervous disorder appeared in a segment of the canine population in southeastern Vermont. Similar cases were reported in New York State and other parts of the Northeast. Dogs of all ages and breeds exhibited a marked stiffness in their hindquarters and varying degrees of paralysis. Other symptoms observed in a number of cases included nystagmus, opisthotonus, extensor rigidity, and incoördination. In general, these animals presented a spastic appearance. Detailed blood studies were carried out in a number of cases, but aside from a marked eosinophilia in 1 animal, no grossly abnormal hematological picture was evident. Owner interrogation established one outstanding fact. All were feeding a particular brand of commercial dog meal (hereafter referred to as x-meal).

When x-meal was fed to laboratory dogs, it was observed that they became paralyzed in seven to thirty days. This great time variation may possibly be explained on the basis of the amount ingested or on the degree of contamination in a particular batch of feed. Detailed observations on 2 cases in Vermont are presented here.

CASE REPORTS

Case 1.—A 5-month-old female Border Collie had been subsisting on a ration of x-meal and water only. The dog was unable to stand and fell to one side "in a heap" when attempting to alter its position. Paralysis, extensor rigidity of the forelimbs, opisthotonus, and nystagmus were marked. Anorexia was complete. Fecal examination revealed a moderate ascariasis. Therapy consisted of parenteral fluids, electrolytes, glucose, amino acids, and vitamins. Improvement was rapid and the patient was able to eat on the following day. Liberal quantities of milk and horse meat were offered and greedily devoured. On the second day, recovery was complete. After eight days of apparent good health, the pup was again shifted to a ration of x-meal and water only. An exacerbation occurred in eighteen days and for two weeks, until the dog was killed, symptoms ranging from moderate to severe were always evident. If food and water were refused for approximately two days, recovery would be sufficient for the intake of food (x-meal) and water to be resumed, followed in several days by another exacerbation. There were no gross lesions on postmortem examination.

Case 2.—A young female Collie-type mongrel in excellent health was purchased and placed on a ration of two cups of x-meal and water daily. In exactly thirty days, the dog became stiff in her hindquarters and a moderate degree of opisthotonus and incoordination were observed. After two to three days of stiffness, a slight improvement occurred which allowed food intake to be resumed. An exacerbation invariably followed resumption of eating. This pattern repeated itself until the dog was destroyed. No gross postmortem lesions were evident.

In attempting to isolate the toxic agent in x-meal, quantities of this feed were either ashed or extracted by alcohol or ether. The extractions, residues from the extractions, and the ashes were fed separately to different dogs along with their regular ration. The toxic material was found to be present in the ether extract. Animals receiving the ether extract or residues from the alcohol extract showed the identical paralytic symptoms observed in those animals fed on x-meal. Dogs receiving the other supplements remained normal.

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[1]Elsasser, D. S., Grundish, R. W., and Ralston, J. W.: An Unusual Type of Food Poisoning in Dogs. North Am. Vet., 32, (1951):839.

The authors thank the Lederle Laboratories of Pearl River, N. Y., for supplying the nitrophenide, commonly sold under their trade name of "megasul" 25 per cent; and the Abbott Laboratories of North Chicago, Ill., for supplying the arsonic acids used in these tests.

Chemical tests proved that the toxic agent was nitrophenide.

EXPERIMENTAL

Three experiments were carried out to determine (1) the toxic level of nitrophenide in the dog; (2) the lethal doses of nitrophenide in the dog; and (3) to study the effects of other anticoccidial poisons in dogs. The animals used in all experiments were fully grown, purebred Beagles, weighing between 7 and 12 kg.

Expermient 1.—In this trial, to determine the toxic level of nitrophenide, only 1 dog was allotted to each level. The nitrophenide was added to a basal commercial ration at five levels: 0, 0.0025, 0.005, 0.01, and 0.015 per cent. Animals were all individually fed and their feed intake was limited to furnish the following levels of nitrophenide: 0, 0.9, 1.6, 2.0, and 4.0 mg. per kilogram of body weight. With the exception of the dog fed 4.0 mg. of nitrophenide (0.015 per cent), all animals failed to show toxic symptoms at the termination of the four-week experiment. The animal fed the 0.015 per cent level lost weight during the four-week experiment but did not develop paralysis.

Six litter mates were then divided equally into two lots. Those in lot 1 received the basal ration; while those in lot 2 received the basal ration plus 0.025 per cent nitrophenide (recommended level, 0.0125-0.025 %). All the dogs fed the basal ration grew normally, while those fed the 0.025 per cent level of nitrophenide showed paralysis. One became paralyzed on the sixteenth day and 2 on the twenty-third day — longer periods of tolerance than those fed the x-meal, in which paralysis occurred in as short a time as seven days. This commercial ration, therefore, apparently contained a higher level of the poison than that recommended for chicken feed. This was probably due to the electrostatic effect of the compound on the mixer.

Experiment 2.—The aim of this experiment was to determine the lethal dose of nitrophenide in dogs. This trial was similar to experiment 1, except that the dogs were given one large dose of nitrophenide at the following levels: 15.0, 25.0, 30.0, 37.5, 45.0, and 50.0 mg. per kilogram of body weight. Two dogs were used for each level with the exception of the 37.5 and 50.0 levels in which 1 and 3 were used, respectively. The animals receiving 0-, 15.0-, 25.0-, and 30.0-mg. levels remained normal after they had been fed the single dose of poison. The dog receiving the 37.5-mg. dose became paralyzed two hours after the feeding and remained completely paralyzed for one day. Improvement was evident the following day but despite various therapeutic measures and an increase in body weight the incoördination and shaking continued until the dog was killed four months later. Necropsy revealed no lesions except a duodenal ulcer.

One of the dogs receiving the 45-mg. level died of typical nitrophenide poisoning, but severe diarrhea and vomiting occurred in the other dog which probably eliminated the poison and prevented the usual symptoms. All of the 3 dogs receiving 50 mg. of nitrophenide died within three to five days with typical symptoms.

Experiment 3.—The aim of this experiment was to study the effects of other anticoccidial poisons on dogs. Arsenilic acid; 3-nitro, 4-hydroxyphenyl arsonic acid (arsonic acid); and nitrosal were tested. This trial was similar to experiment 1 except that only 1 dog was used in each lot. The animals were taken off test as soon as toxic signs were evident. One additional dog was destroyed, using a single large dose of each of the three poisons as follows: arsenilic acid, 0.35 mg.; arsonilic acid, 0.35 mg.; and nitrosal, 0.40 mg., each per kilogram of body weight. There were seven lots in this trial as follows:

Lot	I	basal
Lot	II	basal + 0.01% arsenilic acid (4 weeks)
Lot	III	basal + 0.04% arsenilic acid
Lot	IV	basal + 0.01% arsonic acid
Lot	V	basal + 0.04% arsonic acid
Lot	VI	basal + 0.1% nitrosal
Lot	VII	basal + 0.4 % nitrosal

The lower level of each poison was the level recommended for controlling coccidiosis in chickens. With the exception of the animals fed on the basal ration or on the basal ration plus 0.01 per cent arsenilic acid, all the dogs were sick a few days after they had been placed on experiment. All of the sick animals lost their appetites quickly. Those fed the 0.04 per cent arsenilic acid and the 0.01 and 0.04 per cent arsonic acid lost weight within a week, while those fed the 0.1 and 0.4 per cent nitrosal did not lose weight until two weeks had elapsed. The dog fed 0.04 per cent arsenilic acid developed anorexia on the thirteenth day and died on the eighteenth day. Postmortem examination showed enlargement of the heart and kidneys, gastric hemorrhage, dark shrunken lungs, and a normal liver. Stiffness was absent in the dogs fed arsenilic acid and nitrosal but present in the hind legs of dogs fed arsonic acid. This stiffness did not disappear completely until the animals had been off the experiment for a full week. A peculiar greenish urine was noticed in some of the animals fed these arsenic compounds.

DISCUSSION

The first symptom of chronic nitrophenide poisoning in dogs is stiffness in the hind legs. This is followed by incoordination, paralysis and, in some cases, opisthotonus and nystagmus. The appetite remains fair to good. A remission usually follows a short period of inability to eat. Therefore, the therapy employed in case 1 was probably superfluous. Since the manufacturers of x-meal were unaware of the highly toxic nature of nitrophenide for dogs, precautions had not been taken to

avoid the contamination of this dog feed by poultry feed mixes containing nitrophenide.

The nystagmus and relatively good appetite seen in dogs poisoned with nitrophenide is absent in animals fed the arsenic compounds. Dogs poisoned by nitrophenide recover in one to three days, whereas dogs poisoned by the arsenic compounds have a convalescent period of seven to ten days.

Dogs receiving large doses of nitrophenide become acutely poisoned within two to twenty-four hours. They develop depression and restlessness followed by tetanic convulsions. Complete paralysis occurs within an hour or two after the onset of symptoms. Periodic convulsions and running movements occur from time to time after complete paralysis. Death usually follows in three to five days. Upon necropsy, the gastrointestinal tracts were generally found empty. No internal pathological changes were found. The lungs, heart, kidneys, and liver were normal, but 2 dogs had shiny, yellowish gall bladders. It seems likely that death from nitrophenide poisoning is due more to exhaustion than to starvation.

SUMMARY

A considerable number of dogs eating the feed of a single manufacturer became paralyzed. The feed was found to contain nitrophenide, an anticoccidial agent which seems to have been introduced accidently by mixing poultry feed in the mixer just before mixing the dog feed.

A single dose of 37.5 mg. of nitrophenide per kilogram of body weight produced permanent paralysis, while 50 mg. per kilogram killed adult Beagles. A level as low as 0.4 mg. per kilogram, daily for two to four weeks, proved toxic to dogs.

Some other anticoccidial compounds were also fed to dogs to determine their toxicity. A higher level of arsenilic acid than is commonly used in chicken feeds was needed to produce toxic symptoms in dogs; while nitrophenide, arsonic acid, or nitrosal fed at levels commonly used in chicken feeds produced toxic symptoms in about four weeks.

No gross internal pathological lesions were associated with nitrophenide toxicity, but substantial damage was observed in dogs poisoned with compounds of arsenic. Nitrophenide is especially dangerous since it does not cause anorexia and nausea as do the arsenic derivatives.

Canine Infectious Hepatitis — Fox Encephalitis (Committee Report)

Infectious hepatitis is an acute febrile disease in dogs that occurs throughout the world. In severe cases, illness is accompanied by a marked leukopenia and severe depression, although many dogs may have such mild illness as to escape detection by ordinary observation. It is caused by a virus that characteristically produces intranuclear inclusion bodies principally in liver cells.

Etiology and Epidemiology.—Dogs of all ages are susceptible and infection occurs through ingestion of a virus which is not airborne. During the acute phases of illness, the virus is present in all secretions and excretions but later is found only in the kidneys where it is eliminated in urine for long periods; the longest recorded thus far is 271 days.

The elimination of virus in the urine from animals recovered from the infection would appear to be the most prevalent method in the spread of this disease, and the natural habits of dogs encourage spread by this route. Exposure to the infection at dog shows and boarding kennels is greatly enhanced by this factor, as is the opportunity for infection by direct contact. Contamination of feeding utensils in boarding kennels by secretions during the acute stage of illness, or urine after recovery, would constitute another means of spreading the infection. It is common practice to open the dog's mouth for inspection as is done, for example, by show judges. Carrying saliva on the hands from an infected animal could spread disease. Intravenous and subcutaneous therapy that make use of improperly sterilized hypodermic needles will transfer infection between dogs. Failure to properly clean and sterilize catheters used for the collection of urine offer a possibility of disseminating disease.

Foxes are naturally susceptible to the virus, but they have not been shown to be involved in the spread of disease in dogs. Since the disease has been seen in wild animals and probably has the same mechanism of dissemination, however, there is a possibility of spread between dogs and foxes.

Clinical Features.—The course of the disease follows a similar pattern in both dogs and foxes, although dogs vary in response from a slight fever to a moderate or severe reaction which terminates fatally in about 10 per cent of the cases, while domesticated foxes are reported to show a high mortality. The complement-fixation test has shown that an average of 50 per cent of

This is the 1953 report of the Special Committee on Infectious Hepatitis, which was received too late to be considered by the Executive Board and the House of Representatives at the Ninetieth Annual Meeting of the AVMA in Toronto.

dogs over 1 year of age have had hepatitis. Regardless of severity of illness, the incubation period reported in dogs was two to three days when the virus was given intravenously, three to four days when given subcutaneously, four to six days when the virus was fed, and six to nine days when susceptible dogs were exposed by contact to infected dogs. The first sign of illness is an elevation of temperature above 104 F. which may last one to six days. Usually, there is a "saddle"-type temperature curve characterized by an initial elevation for one day, then a drop for a day, followed by a secondary rise. In most cases, the decrease between elevations did not represent a return to a normal temperature, since initial and secondary rises were quite high.

On the day after the initial temperature rise, the total circulating leukocytes decrease in number and the leukocyte count remains low througout the febrile period. The degree of leukopenia varies and there seems to be a correlation between it and the severity of illness. As a rule, a differential white blood cell count shows a decrease in neutrophils with little change in numbers of the other cells. If the fever is of short duration, this is sometimes the only sign; but if the fever persists for longer than one or two days, other symptoms become noticeable.

General signs of illness are apathy, with partial or complete loss of appetite and intense thirst; conjunctivitis accompanied by a serous discharge from the eyes and nose; an intense redness of the mucous membranes of the oral cavity; enlarged tonsils are sometimes seen, but the degree of involvement varies; abdominal tenderness can sometimes be elicited by palpation of the abdomen; and sometimes vomiting occurs.

Subcutaneous edema of the head, neck, and trunk is seen occasionally and at times causes disfigurement. Petechial and ecchymotic hemorrhages of the skin occur in a few cases, primarily in the region of the abdomen. When dogs injure themselves during illness, they usually bleed profusely from the site of injury. Controlling the hemorrhage is difficult because of prolongation of bleeding time. There is direct correlation between the severity of illness and the length of bleeding time. Respiratory complications or involvement of the nervous system is not usually seen in dogs. Domesticated foxes may show convulsions intermittently during the course of illness. Toward the end, paralysis involving one or more of the limbs or of the entire body occurs.

After the period of general malaise ends, animals eat well; but not for some time do they regain the weight lost during acute illness. Approximately 25 per cent of dogs that recover show a transient corneal opacity involving one or both eyes. This lesion develops seven to ten days ness.

In dogs, natural cases of simultaneous infection with the viruses of infectious canine hepatitis and distemper probably occur more often than is realized. Simultaneous infection with distemper and infectious canine hepatitis viruses produces a more severe illness than when either virus infects singly: the incubation period is shortened, the temperature and leukopenic reactions are more severe, the percentage of deaths is higher, death comes more quickly, and the convalescent period in survivors is longer.

Pathology.—The primary destructive changes occur in the blood vessels and the hepatic cells. The disintegration of blood vessels often produces such lesions as intraocular hemorrhage, bleeding in the oral cavity, and hemoperitoneum with 50 to 500 cc. of hemorrhagic fluid often found in the abdominal cavity. Paint-brush ecchymosis of the gastric serosa and hemorrhagic lymph nodes is seen. The liver appears normal in size but it is usually tan, with darker, mottled variegations. Occasionally, it is tannish red and slightly hyperemic. The gall bladder wall becomes edematous and thickened; in some instances the wall may be 1 cm. in thickness. Edema of the thymus is a common finding, with or without petechial hemorrhages.

Histological study of regularly prepared paraffin sections stained with hematoxylin and eosin show degeneratvie changes, characterized by hepatic cell necrosis, particularly around the central lobular vein. There also are marked deposits of brown-staining pigment, probably hemosiderin, scattered throughout the sections. The nucleus of the hepatic cell remains intact longer than the cytoplasm and many of the nuclei are hypertrophied.

This nuclear hypertrophy is the first step in the formation of the inclusion body. The basichromatin and linin network is then broken up and marginated along with the nucleolus. The inclusion then becomes organized in the center of the nucleus. The inclusion body at first stains acidophilic with hematoxylin and eosin. Later, the marginated basichromatin liquefies and colors the nuclear contents, which turns the inclusion from acidophilic to lavender when stained with hematoxylin and eosin. Shortly thereafter, the nucleus begins to lose fluid, shrinks, becomes pyknotic, and disappears. The number of inclusions to be found in the hepatic nuclei varies from none, with an occasional ghost cell, to as many as 20 per cent. Inclusions are also found in endothelial cells in blood vessels, in renal glomeruli, and in the brain.

Diagnosis.—In the diagnosis of the disease, reliance in most cases is placed on the overt signs of illness. Usually, the onset is acute and affected animals show marked depression, an elevated temperature, and a leukopenia. Palpation of the abdomen may elicit pain. The tonsils may be enlarged and reddened. Prolongation of bleeding time for more than two minutes suggests infectious hepatitis. Recovered animals may show corneal opacities that involve one or both eyes. Clinical evidence is not always sufficient to differentiate infectious hepatitis from distemper and it may

be necessary to remove a portion of liver by biopsy and examine for characteristic inclusion bodies. A positive diagnosis can be made when typical intranuclear inclusions are found. In cases of death, examinations for characteristic pathology and inclusion bodies are confirmatory.

Prevention and Treatment.—The great incidence and severe effects produced in dogs, especially in combination with distemper, indicates a great need for products that could be used for prevention of infectious hepatitis. There is available at present an antiserum and an inactivated tissue vaccine. Antiserum should be given to puppies from weaning until vaccinated or unvaccinated older dogs in an amount of 0.5 to 1.0 cc. per pound of body weight at intervals of seven to ten days, if the animal is kept under conditions of exposure to the virus, and every fourteen days if kept at home. For longer immunity, dogs may be inoculated with inactivated tissue vaccine. Immunization can begin at 3 to 5 months and should be repeated every six months to one year for the life of the animal. A vaccine to produce a more durable immunity is badly needed and the combination vaccine composed of live distemper and infectious hepatitis viruses, that recently was reported, will be useful.

Since infectious hepatitis is caused by a virus, there is no specific therapy. Blood transfusions of 80 to 200 cc., depending on the size of the dog, given every other day, or 200 to 500 cc. given once, is helpful. In addition, 5 per cent dextrose in saline solution plus 5 per cent protein hydrolysate in an amount of 250 to 500 cc. daily, should be used, and perhaps 1 to 5 cc. of vitamin B complex in saline solution also should be given. A broad-spectrum antibiotic should be given to control secondary infections if any develop.

I. A. BAKER, *Chairman*
H. E. JENSEN R. E. WITTER

Municipal Fluorination Upheld

In reply to a taxpayer's suit, challenging the constitutionality of fluorination of the city's water supply, the Common Pleas Court of Cleveland ruled that "A person's constitutional right to treat his health as he deems best. . . and to be free from medical experimentation. . . are all subordinated to the common good." Also in Milwaukee a resolution to stop fluorination, which had been started in 1953, was defeated.—*Am. J. Pub. Health., Jan., 1954.*

Because sows which have been through a siege of transmissible gastroenteritis have some immunity, they may be kept for later farrowing. This is safer than gambling on newly purchased sows.—*L. M. Hutchings, D. V. M., Indiana.*

Spreading Hog Cholera in Britain

During a recent epizoötic, swine fever was diagnosed on about 2,500 farms in Britain, with perhaps 1,500 other outbreaks not confirmed because the hogs had gone to slaughter. Infective pork and bacon from hogs in the incubative stage must be spreading the disease.—*Vet. Rec., Nov. 14, 1953.*

Clostridium Perfringens Vaccines

The limited quantity of *Clostridium perfringens* type C toxoid and antitoxin, effective agents in the prevention and treatment of hemorrhagic enterotoxemia of young calves and lambs, is to be distributed under the supervision of Dr. L. A. Griner of Colorado A. & M. College, Fort Collins. The vaccine is produced by the Corn States Serum Company but to attain further information on its efficiency, they have requested Dr. Griner, whose research developed these vaccines, to continue his studies on them.—*Rocky Mountain Vet., Nov., 1953.*

Equine Research Projects

In an appeal for funds to support research on equine and other animal diseases, Dr. A. L. Brueckner, Hyattsville, Md., mentioned several equine diseases which are being studied at various state experimental stations.

Among these diseases are equine influenza, virus abortion, infectious anemia, encephalomyelitis, and the various vesicular diseases. In addition, research is being done on parasite control, nutritional requirements, and equine improvement through breeding. With nearly $2 billion being handled annually through parimutuel systems, if only 0.1 per cent were set aside for research, it would provide $2 million annually.—*Blood Horse, Dec. 12, 1953.*

The increased virulence of bovine shipping fever in recent years is indicated by comparison with data from 1926, when the death loss among 57,496 feeders shipped from Kansas City, whether vaccinated or unvaccinated, averaged only 1.14 per cent. Today, losses would be many times that heavy were it not for the newer antibiotics and sulfonamides.—*W. A. Aitken, D. V. M., Illinois.*

Furazolidone in the Treatment of Fowl Typhoid in Turkeys

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FOWL TYPHOID is a disease of major economic importance to the poultry industry. The causative agent, *Salmonella gallinarum*,[1] and the disease process have been adequately described by others.[1,2] No completely satisfactory treatment for the disease has been offered. A few of the sulfonamides, especially sulfaquinoxaline, have shown merit in reducing mortality associated with this condition.[3-11] Satisfactory control of this disease by use of these drugs is not always obtainable. A study of furazolidone* in the treatment of experimentally infected turkey poults was undertaken in order to determine the drug's effect on this disease.

MATERIALS AND METHODS

Two experiments were conducted, using the same equipment and similar methods. The equipment was thoroughly disinfected and allowed to stand vacant for six weeks between experiments.

Turkey Poults.—Broad Breasted Bronze poults were obtained from a commercial hatchery. Poults used in experiment 1 were 1 day old when received and were 27 days of age when exposed. The poults used in experiment 2 were 9 days old when received and were 23 days old when exposed.

Cultures.—The culture of *S. gallinarum* used in these studies was originally isolated from a natural outbreak of fowl typhoid in turkeys. It was passed through turkeys twice before being used in these experiments. The inoculum used was a 24-hour nutrient broth culture enriched with 1 per cent PPLO† serum fraction (Difco). Each poult was exposed by receiving 1 cc. of the culture directly into the crop. In experiment 2, poults were given a second exposure twelve days after the initial inoculation by the addition of infected liver tissue to the drinking water for twenty-four hours. Experiment 1 was terminated on the fourteenth day and experiment 2 on the twenty-second day following exposure.

Feed.—A commercial turkey starter mash was used throughout both experiments.

Medication.—Furazolidone was in the form of an 11 per cent premixture in cornmeal. The sulfaquinoxaline** was used as the pure drug. Two concentrations of furazolidone were used in each experiment, 0.011 per cent and 0.0055 per cent, and one concentration of sulfaquinoxaline, 0.033 per cent. The drugs were mixed into the feed with an electric feed mixer.

RESULTS AND DISCUSSION

Tables 1 and 2 give the experimental outline and results. Furazolidone fed continuously at a concentration of 100 Gm. per ton (0.011 %) prevented all mortality from fowl typhoid when given as late as three days following exposure. The drug at a concentration of 50 Gm. per ton (0.0055 %) prevented mortality when given continuously starting three days before exposure, at time of exposure, and three days following exposure; however, this level did not provide a desirable degree of protection when started five days after exposure (table 1, lot 7).

TABLE 1—The Value of Furazolidone Against Fowl Typhoid in Turkeys (Experiment 1)

Lot[1] No.	Exposed[2]	Medication[3]	Typhoid mortality (No. birds)	Typhoid mortality (%)
1	No	None	0	0
2	Yes	None	17	85
3	Yes	Furazolidone-0.011% started 3 days before exposure	0	0
4	Yes	Furazolidone-0.011% started 5 days after exposure	1	5
5	No	Furazolidone-0.011% given as a check on toxicity	0	0
6	Yes	Furazolidone-0.0055% started 3 days before exposure	0	0
7	Yes	Furazolidone-0.0055% started 5 days after exposure	8	40
8	Yes	Sulfaquinoxaline 0.033% started 3 days before exposure	15	75
9	Yes	Sulfaquinoxaline 0.033% started 5 days after exposure	20	100
10	Yes	None	18	90

[1]There were 20 poults in each lot. The poults were 27 days old when exposed.

[2]Each poult was given 1 cc. of a 24-hour broth culture of Salmonella gallinarum per os.

[3]All medication was given in an all-mash ration and fed continuously from the time indicated until the experiment was terminated fourteen days following exposure.

From Texas Agricultural Experiment Station and School of Veterinary Medicine, Texas A. & M. College, College Station.

*Furazolidone is the generic name of furoxone® (N-(5-nitro-2-furfurylidene)-3-2-oxazolidine) made by Eaton Laboratories, Inc. For this study it was supplied as NF-180® (trademark of furazolidone mixture) by Dr. Hess and Clark, Inc.

†PPLO = pleuropneumonia-like organisms.

**Supplied by Merck and Company, Rahway, N. J.

Sulfaquinoxaline fed continuously at a concentration of 0.033 per cent in the feed, starting three days before exposure, did not afford protection under the conditions of this experiment, since 75 per cent of the inoculated poults died.

While weights or feed consumptions were not critically evaluated, there was no evidence of unpalatability or toxicity after twenty-two days on either level of furazolidone.

TABLE 2—The Value of Furazolidone Against Fowl Typhoid in Turkeys (Experiment 2)

Lot[1] No.	Exposed[2]	Medication[3]	Typhoid mortality (No. birds)	Typhoid mortality (%)
1	No	Furazolidone-0.011% started 3 days before exposure	0	0
2	Yes	Furazolidone-0.011% started 3 days before exposure	0	0
3	Yes	Furazolidone-0.011% started at time of exposure	0	0
4	Yes	Furazolidone-0.011% started 3 days after exposure	0	0
5	Yes	None	16	80
6	Yes*	Furazolidone-0.0055% started at time of exposure	0	0
7	Yes	Furazolidone-0.0055% started 3 days before exposure	0	0
8	Yes	Furazolidone-0.0055% started at time of exposure	0	0
9	Yes	Furazolidone-0.0055% started 3 days after exposure	0	0
10	Yes	None	17	85

[1]There were 20 poults in each lot. Poults were 23 days old when exposed.

[2]Each poult was given 1 cc. of a 24-hour broth culture of Salmonella gallinarum per os. A second exposure was given 12 days following initial exposure by addition of infected liver material to the drinking water.

[3]All medication was given in an all-mash ration and fed continuously from time indicated until the experiment was terminated 22 days following initial exposure.

*Exposed by inadvertent contact with birds in lot 7.

An outbreak of fowlpox occurred during the second experiment, but no losses were attributed to this disease. All birds that died were necropsied and all had lesions typical of fowl typhoid. Cultures from livers and spleens were made on SS agar (Difco). Salmonella organisms were recovered in each instance and later identified as *S. gallinarum* by inoculation into suitable carbohydrate mediums.

At the termination of experiment 2, 10 birds receiving furazolidone were selected and killed. Their intestinal tracts were cultured by use of tetrathionate broth and SS agar. *Salmonella gallinarum* was isolated and identified from 2 birds receiving 0.011 per cent (100 Gm./ton) of the drug.

The apparently healthy exposed and treated birds and the survivors of the controls remaining from the first experiment were placed together in an uncontaminated range shelter and given nonmedicated feed. Deaths due to fowl typhoid occurred eight days later. Medicated feed containing 0.011 per cent furazolidone stopped mortality in four days. Treatment was continued for ten days without further losses. The surviving birds were then moved to clean range, provided with uncontaminated equipment, and given nonmedicated feed. No further losses had occurred 150 days after discontinuing the drug.

The survivors from the second experiment were divided into two groups. One group consisted of apparently healthy exposed and nonexposed treated (0.011% furazolidone) birds. The other group consisted of apparently healthy exposed and treated (0.0055 % furazolidone) birds and the survivors of the controls. Deaths from fowl typhoid occurred in both groups seven days later. Medicated feed (0.011 % furazolidone) stopped mortality in three to four days.

No additional losses occurred during the two-week period the birds received the drug. At the end of this time, the birds were again placed on nonmedicated feed and left in the same shelters with no sanitary precautions taken. Deaths from fowl typhoid again occurred in both groups within six days and treatment (0.011 % furazolidone) for fourteen days was again necessary to control mortality. This emphasizes the value of sanitary methods in the control of fowl typhoid.[12] No further losses had occurred in these contaminated pens sixty days after discontinuing the drug. Forty-five days after the withdrawal of medicated feed, each survivor was tested, using the tube-agglutination test and standard Pullorum antigen. Twenty per cent of the birds were found to be reactors. Two of these reactors were killed and cultured. *Salmonella gallinarum* was isolated from the small intestine of one.

At the present time, furazolidone must be given in the feed as it is relatively insoluble in water. An obvious disadvantage

to this type of treatment is that sick birds which have stopped eating will not benefit from medicated feed. This may result in a slower drop in the mortality in a badly infected flock than might be desired. Several sick birds brought to the diagnostic laboratory from typhoid-infected flocks have been successfully treated with 100-mg. capsules. Individual treatment of sick birds combined with medication in the feed might be a worth-while procedure in some flocks.

SUMMARY

Furazolidone fed in the feed at levels of 0.011 per cent and 0.0055 per cent was found to be effective in preventing mortality associated with fowl typhoid (*Salmonella gallinarum*) infection in turkeys. The higher level of 0.011 per cent was found more effective in severely infected birds. No evidence of toxicity or unpalatability was encountered. Exposed and treated birds have been shown susceptible to reinfection and to be carriers of *S. gallinarum*.

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Dissemination of Biological Warfare Agents

There are many methods easily adaptable for intentional dissemination of parasites pathogenic to man. Aircraft, submarines, and surface vessels could launch such attacks. If covert biological attacks were attempted, water, food, or air in ventilating systems would seem to be vehicles of choice.

Animal diseases can be introduced and spread secretly, with little chance of detection, through feeds, biological products, raw garbage, and perhaps even by infected wearing apparel of man. While biological warfare agents could probably be successfully spread among animals by aircraft, it is more probable that clandestine methods would be used. The ability of an enemy to utilize wild animals should not be overlooked.

Plants and crops can be attacked with exotic pathogenic spores used in overt methods of mass inoculation or in covert methods of establishing small foci of infection initially, with the expectations of producing serious disease or insect problems.—*Civil Defense Against Biological Warfare (Tech. Manual), Federal Civil Defense Administration, Nov., 1953.*

A few cases of "hemorrhagic syndrome" of poultry were seen in Delaware in 1952. In 1953, it vied with chronic respiratory disease and Newcastle disease for the position of the most prevalent poultry disease in the state. It affects chickens from 3 to 11 weeks old but usually those that are 4 to 7 weeks of age. The cause is unknown. Many cases occur when no sulfonamides are fed.—*M. S. Cover, V.M.D., Delaware.*

Since no 2 horses have identical "chestnuts," photographs showing their location and peculiarity are as valuable for identification as are fingerprints for identifying man. A number tattooed inside the horse's upper lip also is helpful in identification.—*D. W. Crisman, V.M.D., Pennsylvania.*

Antibiotics in the diet might be likened to intestinal policemen controlling the microflora.—*E. I. Robertson, Ph.D., Pennsylvania.*

A Review of Some Basic Concepts of the Biology and Pathogenesis of Acute Ionizing Total Body Radiation

Lieutenant Colonel CHESTER A. GLEISER, V.C., U.S. Army

Washington, D. C.

THE CONCEPT of ionizing radiation injury is not new. Dr. Wolbach, in 1909,[1] described the changes in skin and collagen resulting from chronic radiation injury. The concept of total body radiation, however, is relatively new, having been ushered in by atomic energy and, specifically, by atomic weapons.

Total body radiation may be defined as exposure of the entire surface of a body to ionizing radiation so as uniform a dose distribution as possible is delivered to the body. Total body radiation injury thus differs from acute injury resulting from therapy, wherein a small surface of the body is exposed to a large dose of ionizing radiation, usually x rays. It also differs from chronic radiation injury, wherein a certain area of the body is exposed to repeated doses of ionizing radiation; for example, the hands of pioneer radiologists, and also the chronic total body radiation injury produced by repeated infection of isotopes. These distinctions are important and are stressed because tissue reactions differ quantitatively in radiation injury of these types. The differences in tissue reaction are primarily due to varying sensitivities to ionizing radiation. Tissues in which the injury is severe are said to be radiosensitive; those in which the reaction to radiation is slight or apparently absent are said to be radioresistant. These are not absolute terms. They are purely relative because radiosensitivity is dependent on numerous variable factors. Tissues that may be relatively radioresistant to a single moderate dose of total body radiation may react to a massive dose or to repeated moderate doses, or they may react belatedly, as the lens of the eye.

Numerous sources of radiation may be used to induce radiation injury. Some of these are x rays, *gamma* rays from a nuclear explosion, *alpha* particles, *beta* rays, a neutron flux, radioactive elements, and several others. There may be some variation in specific pathological changes as, for example, *beta* rays readily produce superficial burns, whereas *gamma* rays, because of their deep penetration, ordinarily do not. However, the basic biological effects produced by radiation from any of these sources are essentially similar. Certain radioactive materials which are used for tracer studies show a striking selectivity for certain tissues, and their effects may be confined to them, but again the biological effects are similar.

Primary biological changes of radiation injury take place at the time of exposure. Initial injuries may not be seen microscopically, although morphological changes have been observed as early as one hour after radiation.[2] The mechanisms of the biological action of radiation injury are not clearly understood, but many possibilities have been proposed. Among these are: (1) production of ion pairs; (2) production of hydrogen peroxide; (3) destruction of sulfhydryl enzymes, and thus embarrassment of the respiratory activity of cells; (4) alteration of function; (5) cessation of reproduction; (6) mutations; (7) alterations in cell membrane permeability; (8) protein denaturation; (9) mechanical molecular breakage; (10) chromosome breakage.

The concept proposed by many workers in the field today is that there are two kinds of action on the body—direct and indirect. Direct action refers to the excitation of a molecule which may result in bond breakage and the rearrangement of the molecule. Indirect action refers to the ionization of the aqueous system of a body with the production of –OH and HO_2. These radicals may hit a protein or an enzyme, (both in dilute solution) or a gene. It has been estimated that 75 per cent of the hits in a body are indirect hits and 25 per cent are direct hits. The –OH and HO_2 are oxidizing and reducing agents, so that, essentially, we are dealing with an oxidation-reduction phenomenon in which the HO_2, a strong oxidizing agent, plays the prominent role. Since enzymes are unstable mole-

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cules, they are particularly vulnerable, and it is believed by many that inactivation of enzymes plays a large part in radiation injury.

There is disagreement among workers as to the production of hydrogen peroxide (H_2O_2) in tissues following radiation. Hydrogen peroxide is, of course, a strong oxidizing agent.

Bombardment of genes, as well as enzymes and molecules, may occur which may result in breaking a bond or rearranging a molecule which, in turn, will result in a mutation. One of the most important long-range effects of radiation may well be such genetic changes in populations.

VARIABLE FACTORS IN RADIATION INJURY

Reference has been made to the variable factors in radiation injury. These are (*a*) dose, (*b*) length of exposure, (*c*) species and individual susceptibility, (*d*) relative tissue susceptibility, and (*e*) quality of radiation.

a) Dose.—The magnitude of the reaction is partially dependent upon the magnitude of the dose, but at present there is no satisfactory biological measure of radiation. The physicist's yardstick, the roentgen, is still used for measuring dosage. The roentgen (r), a measure of ionization in air, does not measure the dose absorbed by the tissue. It has been proposed that a biological measure of the radiation activity within living tissues be instituted and used by radiobiologists who must now resort to measurements in terms of mortality. Two expressions most commonly used for this purpose are l.d.50/30 and l.d.100/30; l.d.50/30 being that dose of radiation or total body radiation which will kill half of the animals within thirty days; l.d.100/30 refers to that dose of total body radiation which will kill all of the animals within thirty days.

b) Time.—The length of time over which a dose of radiation is delivered is of utmost importance. Two-hundred roentgens delivered within a few minutes can be much more injurious than the same dose delivered over a period of one week.

c) Species Susceptibility.—There is marked variation in the susceptibility of different species of animals to radiation injury and total body radiation. A list of the l.d. 50/30 of total body radiation of some of the experimental animals frequently used in radiation studies illustrates the wide variation in species susceptibility.

Guinea pig	250 r
Dog	315 r
Mouse	500 r
Rat	650 r
Rabbit	875 r

d) Individual Susceptibility.—The variation in individual susceptibility may be observed in any study designed to measure l.d. 50/30 by exposing a number of animals to an identical dose. One worker has expressed the opinion that it may vary to the extent of ± 50 per cent. The larger the group of animals used in measuring l.d. 50/30, the more evident the difference is.

e) Tissue Susceptibilities.—Differences in the susceptibility of tissues to radiation injury are apparent in tissues from animals that have received doses of total body radiation. The impression gained is that tissues possessing a higher rate of reproduction, or a higher mitotic rate, are the more radiosensitive. Lymphatic tissue, bone marrow, and intestinal epithelium (small intestine) all possess high mitotic rates and all are extremely radiosensitive.

To express this phenomenon in another way, the less differentiated the component cells of the tissues, the more sensitive the tissues. The highly differentiated specialized cells such as the parenchymal cells of organs, the cells of adult bone, muscle, salivary glands, etc., appear to be relatively radioresistant. If the tissues were to be placed in a scale of radiosensitivity (acute total body radiation) in decreasing progression, such a scale might be as follows:

1) Lymphoid elements
2) Epithelium of small intestine
3) Hematopoietic tissue (erythroid and myeloid)
4) Germinal epithelium
5) Epithelium (skin)
6) Connective tissue
7) Cartilage and immature bone
8) Central nervous system
9) Skeletal muscular tissues (mature bone and muscle)

It should be reiterated that this is a relative, not an absolute, scale, because, as pointed out previously, radiosensitivity and radioresistance are relative qualities depending on several variable factors.

MECHANISM OF RADIATION CHANGES IN TISSUE

The mechanism of the production of the morphological changes within tissues is not clearly understood. The pathological changes are not specific for radiation injury. There is no single change that is peculiar to radiation injury alone, nor is there a single composite picture of radiation injury. There are other agents that may produce similar effects, benzol and nitrogen mustards being the most common examples. No stimulating or beneficial effects are exerted upon tissues or cells by radiation, and the concept formerly held that radiation had a stimulating effect on cells has fallen into disrepute. Immediate damage may be present after initial exposure to radiation even though the pathological changes might not be evident immediately, as in

the lens of the eye. The site of action is within the cell and the absorption of energy by cells is the first step in a sequence of events that leads to the morphological and functional changes of a cell. Some of the recognized morphological changes resulting from radiation injury are:

1) Degenerative changes in nuclei:
   a) Pyknosis (concentration or clumping of chromatin material)
   b) Karyorrhexis (explosion and scattering of nuclear material)
   c) Cessation of mitosis
   d) Bizarre mitosis
2) Degenerative changes in cytoplasm:
   a) Changes in staining characteristics
   b) Vacuolation
   c) Atrophy
   d) Actual disintegration
3) Necrosis of cells

HEMATOLOGY OF IONIZING RADIATION

The hematopoietic system serves as an excellent indicator of the effects of total body radiation; that is, the progression of events can be studied by following the changes in the cellular components of the peripheral blood stream. The changes to be summarized are those which might be observed in a group of animals receiving approximately l.d.50/30 of total body radiation. These changes might be roughly grouped into two periods: a period of injury and a period of repair, with the dividing line roughly placed at the end of the first two weeks. The following changes will be observed in such a group of animals.

1) Transient leukocytosis, which lasts for approximately twenty-four hours, followed by a period of extreme leukopenia with a gradual return to normal if recovery takes place.

2) Immediate lymphopenia (drop in lymphocyte count) with very slow restoration and eventual hyperplasia of lymphocytes in case of recovery.

3) A late anemia with slow and difficult restoration of erythrocytes.

4) Pronounced thrombocytopenia (drop in platelet count). This is thought to be an important factor in the onset of the hemorrhagic phase of the total body radiation syndrome.

SYNDROME OF TOTAL BODY RADIATION

The syndrome of total body radiation is composed of three clinical pictures: (1) hemorrhage and septicemia, (2) relatively asymptomatic early death, and (3) neuromuscular disturbances. As observed in a group of dogs receiving total body radiation at approximately an l.d.100/30 level, this syndrome usually has its onset about the seventh or ninth day after total body radiation and is comprised essentially of two processes, septicemia and hemorrhage. The septicemia is attributed primarily to agranulocytosis, *i.e.*, the complete lack of leukocytes to protect the body against bacterial invaders. Agranulocytosis and septicemia are manifested by pyrexia, ulceration and cellulitis with no cellular response, and positive blood cultures.

The hemorrhagic phase of this syndrome and its associated anemia are not as clearly understood as the septicemic phase. It has been thought by some workers that it may result from the septicemia. This, however, is not the concensus. Some investigators have reported that aureomycin has prolonged the survival time of some experimental animals.[7] Allen,[3] several years ago, proposed a heparin-like factor produced in animals that had received total body radiation as responsible for the hemorrhagic phase. Numerous workers, however, have been unable to confirm the presence of such a factor and his concept is no longer accepted. The massive erythrophagocytosis observed in the lymph nodes of animals that have received total body radiation suggests the possibility that certain erythrocytes and also the capillary endothelium might sustain injury resulting in increased capillary permeability or fragility.[2] This view has recently been expressed by Furth and associates working at Oak Ridge National Laboratory.[4,5] At present, the thrombocytopenia is regarded as an important factor in the hemorrhagic phase.[6] Cronkite and his co-workers at the Naval Medical Research Institute at the National Naval Medical Center are investigating this problem and have had some encouraging results with the use of washed platelets in the treatment of animals with the syndrome of total body radiation.

Seldom described is the picture of relatively asymptomatic early death which, for the purpose of this paper, might be called the syndrome at l.d. 100/30 x 2 level. When 10 animals are given total body radiation at twice the l.d. level, 2 or possibly 3 will die within seventy-two hours although practically no gross changes can be recognized. Septicemia and gross hemorrhage will not have developed. At necropsy, edema and a few petechiae in some of the lymph nodes are the only changes, and the cause

of death is not clearly understood. It has been suggested that intestinal injury might be the responsible factor. This syndrome has been observed in dogs that had received approximately 1,200 r total body radiation.

The neuromuscular picture in this syndrome is produced in animals that have received approximately 15 times the l.d 100/30 of total body radiation. Within twenty-four hours, these animals show marked incoördination, ataxia, and disturbance of the locomotor apparatus, and they die within forty-eight to seventy-two hours. This neuromuscular syndrome has recently been observed in some animals that had received approximately 10,000 r total body radiation.

TREATMENT OF TOTAL BODY RADIATION SYNDROME

The therapeutic measures that may be employed in the treatment of the total body radiation syndrome with its hemorrhage and septicemia are obvious. Antibiotics are indicated in an attempt to control the bacterial invasion. Of these, aureomycin has shown some promise.[7] Blood transfusions are needed to replenish the blood that has been lost in the massive hemorrhages. All supportive measures are logical, and special care should be exercised to prevent injuries which may become the nidus of massive cellulitis. Transfusions of platelets have shown some promise in the treatment of this syndrome.[8]

Therapy directed toward other features of the syndrome is not so obvious. In fact, there are no recommendations that can be made at present, because the mechanisms are not clearly understood. Therefore, treatment for all practical purposes should be confined to animals that have received less than l.d. 100/30 of total body radiation, and in the event of an emergency with a shortage of medical supplies, treatment might be confined to that group of animals receiving l.d. 50/30 or less.

PROPHYLACTIC MEASURES

1) *Pre-exposure Measures.*—Jacobson and co-workers[9] have performed some notable experiments within the last few years, in which they have protected animals against total body radiation injury by shielding certain organs with lead. They have had particular success by shielding the spleen and portions of the intestine, especially the appendix, and also by shielding the head or hind leg. Of course, it is obvious that with such shielding one is no longer dealing with total body radiation. Storer[10] has found that, in rats, hypoxia produced by para-aminopropiophenone had significant protective effect. Several workers have found that the administration of sulfhydryl compounds, such as cysteine and glutathione, increased the survival rate.[11] Parabiosis in animals, that is, joining the circulation of 2 animals, also exerted considerable protective effect. The practical significance of these experimental measures for mass population is, of course, questionable. The mechanism in the protective action of the shielding of certain organs or portions of the body, such as the spleen, is not clearly understood. Whether the protective effect is humoral or cellular in nature has not been definitely ascertained.

2) *Postexposure Measures.*—Jacobson[12] has found that transplants of normal spleen in mice, after total body radiation, had a protective effect. Postradiation parabiosis has also been found to offer some protection, although not to the extent of pre-radiation parabiosis, as shown by Cronkite and his co-workers.[13] Jacobson is currently testing the efficacy of injections of extracts of certain tissues, such as splenic extracts, as a postradiation measure. Some recent work has also indicated that whole blood transfusion from nonradiated subjects immediately after radiation has protective value. Lorenz has recently reported the beneficial effects of postirradiation injections of bone marrow from nonirradiated animals.[14]

SUMMARY

The syndrome of acute ionizing total body radiation presents several clinical pictures: (1) hemorrhage and septicemia, (2) relatively asymptomatic early death, (3) and neuromuscular disturbances. The exact mechanisms of ionizing radiation injury are not clearly understood. The pathological changes that result in the period in which observation has been possible, however, have been well studied and long-range effects are under continued investigation. Several pre-exposure prophylactic measures which will increase survival time and rate have been reported, but no postexposure prophylactic measure has been established as generally effective. Treatment of total body radiation injury continues to be

symptomatically supportive, and where emergency and shortage of medical supplies exist should be confined to animals that have received no more than l.d. 50/30 of radiation.

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*This is an excellent review of the field dealing with the different aspects of radiation injury.

The body can tolerate thousands of *beta* rays since they do not penetrate deeply, while a fraction of that dose of *gamma* radiation, which passes through the body, would be fatal.—*B. F. Trum, D.V.M., Tennessee.*

X-Ray Injury of the Patient

X-ray therapy for cancer in the human cervix uteri occasionally produces serious gastrointestinal complications (*Am. J. Surg.*, Jan., 1954). Injury to the rectosigmoid area results in bloody stools and tenesmus. Higher injuries may produce ulcers of the mucosa either with perforation and probable death or with slow healing, excessive scar formation, and adhesions, often resulting in intestinal stenosis and obstruction.

Color and Sun Ray Absorption

Absorption of the sun's rays are greatest in bay and chestnut horses and practically negligible in greys. The alkaline reserves in the blood also appear to be higher in dark-colored horses.—*Vet. Bull., Dec., 1953.*

[*Note*—This once commonly known effect of color may have been forgotten since the virtual passing of the draft horse.—ED.]

That hyperthyroidism may produce precocity was indicated when daily injections with 0.1 mg. of thyroxin accelerated opening of the eyes and teething of newborn puppies.—*Vet. Bull., Dec., 1953.*

The most reliable test for gastritis caused by a foreign body is the typical grunt, detected by a stethoscope on the trachea, when the cow's sternal region is sharply pressed with the knee.—*R. McKinley, V.M.D., Pennsylvania.*

NUTRITION

Twenty Years' Experience with Canned Dog Foods

C. A. ELVEHJEM, Ph.D., Sc.D.

Madison, Wisconsin

During the twenty years that I have followed studies on canned dog food, the development of our knowledge of the nutritional requirements of the dog has been most dramatic and the complete story would fill several books. At first, only a few commercial products were on the market and most dogs relied to a large extent on table scraps from their master's table. When products were manufactured, emphasis was often given to specific ingredients such as horse meat, cheese, and fish. During this period, I was frequently questioned, "Can a nutritionally complete canned food be produced which will be accepted by the dog day after day for his entire life span?" I replied that this could be done with certainty when we knew all the nutritional requirements of the dog and when we knew that the final product contained an adequate and balanced supply of each of these nutrients.

This goal has now been reached to a large extent. For example, our own laboratory has published many papers on this subject, and we have studied all the fat-soluble and water-soluble vitamins required by the dog, as well as the need for minerals, proteins, and fat. The dog played an especially important role in the identification of niacin as the antipellagra factor. Important studies on choline, pyridoxine, biotin, folic acid, and vitamin B_{12} have been conducted with the dog as the experimental animal. The results of these studies have been applied to human beings and farm animals, but the dog has received direct benefit since nutritional deficiencies are seldom seen in this species today when they are fed such nutritionally adequate rations. The studies on running fits in dogs, which turned out to be related to the treatment of cereals with agene, were of major value to the dog since human subjects appear to be nonsusceptible to the methionine sulfoximine which is produced during this treatment.

With each new experimental finding, industry put the results to work in order to produce a better product. A mixture of a variety of foods was compounded into a complete ration. The loss of thiamine during the canning process was recognized early in the program and an adequate supply in the final product is insured by supplying extra amounts in the original mixture. These developments are another excellent example of putting the results of both basic and applied research to work in order to improve, in this case, the health of man's best friend. Man has benefited indirectly not only through improved nutrition for himself, but through simplified and better methods of feeding his pets.

A few people still suggest the use of an all-meat ration for dogs rather than the well-balanced blends of meat products, cereals, fats, and vitamin and mineral mixtures. The former not only are more expensive, but if used for prolonged periods may allow deficiencies to develop.

We have raised dogs for long periods and through several generations on high quality canned food products and water. In many cases, we have used these products as the control ration in nutrition studies.

Unless the feeder is especially well versed in nutrition, it is difficult to produce a food of better quality than those produced by reliable manufacturers.

From the College of Agriculture, University of Wisconsin, Madison.

Vitamin D and Parturient Paresis

Hibbs and Pounden (Ohio Agricultural Experiment Station, Columbus) report that they could prevent parturient paresis in dairy cows by feeding 30 million units of vitamin D daily for five to seven days before parturition. They fed either the oil-concentrated irradiated ergosterol or type 142-F irradiated dry yeast. Feeding such a quantity for this short period is not harmful but prolonged feeding would be. This is about 6,000 times the regular recommended daily dose for dairy cows.—*AFMA Nutr. Abstr., Jan., 1954.*

Vitamin E in Animal Rations

Vitamin E deficiency is believed to be a factor in causing sterility in male rats but not in male mice, by inducing testicular degeneration. In female rats and mice, vitamin E deficiency induces death and resorption of the fetuses. Instead of sterility, it causes muscular dystrophy in rabbits and guinea pigs, which is somewhat similar to "stiff lamb disease" and "white muscle disease" in calves. While progressive muscular dystrophy in man seems quite similar, it does not respond to vitamin E therapy. In young chickens, vitamin E deficiency produces a severe edema, especially in the brain, resulting in encephalomalacia or "crazy chick disease." However, in ducks, it produces instead a muscular dystrophy. Recent evidence indicates that in turkeys, the deficiency induces necrosis of the smooth muscle of the gizzard and an enlarged hock disorder. While this is quite similar to a field condition found in turkeys, vitamin E deficiency has not been proved to be a factor in the latter.

Vitamin E is easily destroyed by oxidation and may, by using up oxygen, protect the more resistant vitamin A and carotene from oxidation. And since the oxidation of vitamin E is speeded by certain unsaturated fatty acids and minerals, the additions of high levels of cod liver oil or lard to rations may abruptly produce a vitamin E deficiency and encephalomalacia in chickens.

Vitamin E was plentiful ten or more years ago in soybean meal but is practically all removed in recent methods of processing. Yellow corn is a good source of vitamin E except in years when it has a high moisture content or when it is allowed to ferment. The vitamin E content of alfalfa meal varies considerably with the quality of the latter. Therefore, in some rations the addition of 3 to 6 Gm. of *alpha*-tocopherol acetate per ton of poultry ration is beneficial for chickens. A higher content may be needed for turkeys.—*The Feed Bag, Jan., 1954.*

Influence of Rations on Mink Vaccinated Against Distemper.—In two experiments with hundreds of young mink, inadequate fish rations did not affect the capacity to produce antibodies after vaccination against distemper.—*Vet. Bull., Dec., 1953.*

Protein Values of Rice, Wheat, and Corn

The protein in milled rice is much superior to that in milled wheat and corn. When half the proteins in milled wheat were replaced by an equivalent amount of proteins in milled rice, it resulted in a 114 per cent increased growth in test rats, and 86 per cent increase in protein efficiency. When half the proteins in milled corn were replaced by proteins in milled rice, the increase in rats' body weight was 236 per cent and increased protein efficiency 165 per cent.—*J. Agric. Food and Chem., Dec. 23, 1953.*

Alfalfa Pellet Supplement

When only poor quality hay is available for dairy cows, dehydrated alfalfa pellets may be fed to advantage. In a one-hundred-day test, a group of 6 cows fed on hay alone dropped 27.2 per cent in milk production, whereas when 0.5 lb. of alfalfa pellets per 100 lb. of body weight were fed, the drop was 15.2 per cent. When the rate of pellet feeding was 1 lb. per 100 lb. of weight, the drop was 3.6 per cent and when increased to 1.5 lb., the milk drop was only 0.7 per cent. The alfalfa pellets are also of value as a source of forage and carotene in young calves to supplement their starter pellets.—*Agric. Res., Dec., 1953.*

Federally Inspected Dog Food.—Dog foods are not required to carry the U.S.D.A. stamp of approval, but such certification is provided for manufacturers who ask for it and pay for the service. The label must tell what is in the can. The term "meat by-products" means liver, spleen, stomach, kidneys, and other edible portions of the animal. Similar inspection is available for cat and fox food. Together, these foods run into millions of dollars of business in a year.—*Agric. Res., Jan., 1954.*

In ruminants, the crude carbohydrates are used to feed microörganisms which, in turn, are devoured by succeeding groups of microörganisms. If one stage of this procedure is missing, the whole process may be upset.—*R. E. Mather, Ph.D., New Jersey.*

EDITORIAL

No Longer a BAI

With the final acceptance of plans for the reorganization of the U. S. Department of Agriculture, and the issuance of the necessary administrative orders and memoranda to effect the changes, the word "bureau" becomes passé in so far as the Department of Agriculture is concerned, including the 70-year-old Bureau of Animal Industry.

To veterinarians and livestock people, this is like losing an old and long-respected friend. We probably will be slow in becoming accustomed to the terminology which identifies the agencies within the U.S.D.A. which are now responsible for functions previously carried out by the Bureau.

Likewise, for some time, it will be difficult to think or speak of federal veterinary service in terms other than "BAI." This is only natural since a tremendous amount of responsibility was vested in the chief of the Bureau, and it is also a tribute to the celebrated veterinarians—Salmon, Melvin, Mohler, Miller, and Simms—who dispatched the duties of this office with such efficiency and renown over the years.

The various bureaus—Animal Industry, Dairy Industry, Entomology and Plant Quarantine, Agricultural and Industrial Chemistry, Human Nutrition and Home Economics—have been a part of the Agricultural Research Administration since 1942, yet the identification "ARA" has not been commonly used in referring to the activities of these groups. Nor was it recognized that the ARA, the "mother agency", was responsible for the execution of bureau programs.

The change became official when, on Dec. 28, 1953, Administrative Memorandum 101.1 defined the functions of the Agricultural Research Service (ARS), the structure of organization through the branch level, and assigned responsibilities. Subsequent memoranda pertained to operating procedures and personnel. With that first memorandum and only a slight alphabetical change, ARA became ARS.

To the veterinary profession, these letters assume new importance, since no single agency other than ARS is responsible for all functions previously handled by the Bureau. With the breaking up of all bureaus and a regrouping of their functions, the names appearing at the branch level have a familiar ring, and some can be matched with previously existing divisions, e.g., "Meat Inspection Branch" and "Meat Inspection Division", yet this analogy is not representative, since there has been a grouping of divisions within the branches in most instances. However, if it is necessary to have a three-letter designation for veterinary services at the federal level, from the standpoint of convenience, then ARS appears to be the logical selection.

In support of this view, a partial enumeration of some of the functions of ARS is enlightening. They include:

1) Coördination of all research activities within U.S.D.A.
2) The research, investigation, inspection, development work, service and regulatory work, and control and eradication of animal pests and diseases.
3) Eradication of foot-and-mouth disease.
4) Hog cholera serum and virus marketing agreement act.
5) Administration of Research and Marketing Act, Title III.

The new approach within ARS appears to be one of identifying the individuals who are responsible rather than the office and, in addition, defining the "chain of command" from the Secretary of Agriculture to the man in the field.

As we become accustomed to the new terminology, certain semantic advantages may become apparent. An *administrator*, his deputies and assistants are responsible at the *service* level. A *director* is responsible for a *division* of the *service*. The person in charge of a *branch* within the division is designated as *chief of the branch*, and within the branch are *section* heads.

The new assignment of veterinarians within ARS includes Dr. M. R. Clarkson, *deputy administrator;* Dr. C. D. Van Houweling, *director* of livestock regulatory programs; Dr. B. T. Simms, *chief*, animal disease and parasite research branch; Dr.

C. L. Gooding, *chief*, animal quarantine branch; Dr. R. J. Anderson, *Chief*, animal disease eradication branch; Dr. A. R. Miller, *chief*, meat inspection branch.

While we do not intend to editorialize on the appointment of personnel within the ARS, the designation of individual veterinarians within the framework of a streamlined Department of Agriculture appears to be appropriate. Future issues of the JOURNAL will carry announcements regarding the appointment and responsibilities of these men.

The need for strengthening and improving federal veterinary service to agriculture has long been recognized and advocated by our Association. To these men in their new capacities, we pledge our full coöperation and assistance.

Hog Cholera and the Vaccination Problem—A Survey

For over a century, no single animal disease has confronted the livestock industry of the United States with a greater problem than has hog cholera. Since the possibility that it can be eradicated from this country, the land of its origin, is a currently moot question, any developments which bear upon its incidence or its control should be of interest.

Therefore, as in the past two years, a report compiled from information provided by swine practitioners on the use and efficiency of the new modified vaccines is again presented.

The following data are based on a questionnaire sent in December, 1953, to the 658 general practitioners in Iowa, a survey undertaken because a discussion of the subject had been requested for that state's recent annual meeting.

The questionnaire was returned by 161, or 24.3 per cent, of the practitioners, which should represent the experience of those who do about 5 per cent of the nation's swine practice. Therefore, while making no pretense of being complete or accurate, the survey at least may be considered as indicating trends in the evolution of the disease and its control. And when combined with the Iowa portion of previous surveys, it shows the trends for more than a two-year period.

THE HUMAN FACTOR

The survey, which brought replies from men in practice from one to fifty-one years, divulged not only technical information but also an interesting study of human nature as represented by a cross section of a group of professional men.

It indicated that younger persons take to new ideas more readily than do oldsters and also that the latter, when they do change methods, apparently tend to prudently consider which new method will be the least arduous.

The data were compiled in the order of years in practice, from the newest to the oldest. The youngest third, all of whom had practiced eight years or less, used the old virulent virus and antiserum method in about 39 per cent of the swine which they vaccinated, and used the new modified virus methods (not including the chemically inactivated virus vaccines) in about 56 per cent. The middle-aged group, who had been in practice from nine to sixteen years, used the old method on 49 per cent and the modified vaccine methods on 48 per cent, while the "old reliables" who had practiced over seventeen years stayed with the old method for 56 per cent of the swine vaccinated and used the new on 40 per cent. Then, when the old serum and virus method was abandoned for other methods, including the inactivated vaccines, one of the more easily handled, single-injection methods was selected by 22 per cent in the younger group, by 26 per cent in the middle group, and by 33 per cent in the older group.

Economics, as indicated by the cost of an immunizing dose of the various products, undoubtedly often influenced the choice and, unfortunately, by restricting the dose, may have at times adversely influenced the results. However, having no means of measuring the economic factor it must be disregarded in this report.

THE METHODS USED

A new type of vaccine, a tissue-cultured (not animal-passaged) modified live virus vaccine, given with antiserum, came into use during the past year and is included in the report for the first time. Altogether, six methods of vaccination are included, since the rabbit-origin vaccines are used both with and without antiserum. This survey indicates that the total percentages of swine vaccinated by each of the six methods (table 1) during 1953 were approximately as follows: (1) virulent virus

and serum—48.6 per cent; (2) inactivated virus vaccines—3.2 per cent; (3) modified live virus vaccines, rabbit origin, without serum—9.7 per cent; (4) the same rabbit-origin vaccines with serum—7.6 per cent; (5) modified live virus vaccines, porcine origin, with serum—26.5 per cent; and (6) the tissue-culture modified live virus vaccine with serum—4.4 per cent.

POSTVACCINATION REACTIONS

Through the many years of vaccinating with the old serum and virus method, the veterinarian's greatest immediate concern usually has been to properly dose each individual so as to avoid the dreaded postvaccination reactions with the subsequent losses. It was hoped that attenuated vaccines would reduce this hazard. However, it would seem that while the ratio of postvaccinational reactions at times may be reduced moderately, it often is increased. The number of swine vaccinated with the old serum and virus method (48.6%) was practically the same, in Iowa in 1953, as the 48.2 per cent which were vaccinated with all modified live vaccine methods combined. Yet serious reactions, six to fifteen days after vaccination, were reported for the old method by 32 (20%) of the practitioners, with a loss of 848 pigs in 97 herds; whereas, with one or more of the new methods, 79 (49%) reported a loss of 1,598 in 266 herds. No attempt has been made in this survey to estimate these losses as a percentage of pigs vaccinated. Nor have the probable causes of the deaths been considered. Although there is evidence[1] that some modified virus vaccines can cause a transmissible cholera-like disease, we should presume that most of these losses are due to secondary infections, except where an inadequate dose of antiserum was given with virulent virus.

Again, as in 1952, no reaction losses were reported after vaccination with the inactivated virus vaccines. Also, reaction losses again varied considerably for the different methods of modified live virus vaccination. Unfortunately, many of the reports on losses following the use of the rabbit-origin vaccines did not specify whether antiserum had been given simultaneously; therefore, although it was evident that losses were greater when serum was not used, the results must be combined and reported under one heading. The 43 who reported reaction losses after use of the rabbit-origin vaccines reported 859 in 113 herds; with the porcine origin vaccine plus serum, 23 reported losing 330 in 86 herds; and with the tissue-culture vaccine plus serum, 22 reported losing 409 in 85 herds.

[1]Biester, H. E., and Schwarte, L. H.: The Hog Cholera Problem and Vaccination. Proceedings Book, AVMA (1952): 56-67.

TABLE I—Iowa Hog Cholera Vaccination Survey

	Older Methods		Modified Live Virus Vaccine Methods			
	Virulent virus + serum	Inactivated virus vaccine	Rabbit origin vaccine alone	Rabbit origin vac. + serum	Porcine origin vac. + serum	Tissue culture vac. + serum
Part A—Percentage Vaccinated by Six Methods						
1952	82.2	3.7	5.4	0.2	8.0	.....
1953	48.6	3.2	9.7	7.6	26.5	4.4
1954 (est.)	44.0	3.1	19.3*		30.3	3.3
Part B—Ratio of Postvaccinational Reaction Losses						
1952	1.0†, 2.0‡	0.0	18.0	0.75	3.25	.....
1953	1.0	0.0	3.0*		0.66	5.6
Part C—Ratio of Immunization Failures, "Breaks"						
1952	1.0†, 2.5‡	31.0	11.5	5.0	12.0	.....
1953	1.0	2.9	2.6*		7.3	(3.0)?
Part D—Percentage of Pregnant Sows Vaccinated by Various Methods (1953) and Ratio of Interference with Litters						
% Vac.	27.0	5.0	27.0*		38.0	3.0
Ratio of Poor Results	1.0	0.0	10.0*		8.0	27.0

*Rabbit origin modified live virus vaccine used with and without serum (combined since many did not designate which method had been used).
†Pigs vaccinated before being weaned.
‡Pigs vaccinated after being weaned.

When the number of reaction losses is compared to the percentage of swine vaccinated by that method, the ratio (table 1, part B) indicates that for every pig lost from the reaction illness when virulent virus was used, the loss was 3.0 with rabbit-origin vaccines; 0.66 pig with porcine-origin vaccines; and 5.6 pigs with tissue-culture vaccines. Thus, as in 1952, only when used with antiserum are the reaction losses ever less with the modified virus methods than with the virulent virus method.

THE IMMUNITY RECORD

Whether it can properly be said that any vaccination ever produces a permanent immunity is a question for the immunologists. However, until recent years it seemed that the immunity developed against hog cholera by the old method usually approached permanency. It, therefore, might be logical to expect that modifying the virulence of the virus would also modify the immunity produced. This seems to have occurred; however, the multiplicity of infections which have appeared in recent years, whether or not any of them be hog cholera variants, has markedly confused the issue. Competent men now often admit an uncertainty at times whether they are dealing with genuine cholera. However, as diagnosed, the losses from hog cholera three weeks or more after vaccination as reported for the various vaccination methods were as follows: with the old method, 21 reported losses of 366 swine in 26 herds; with inactivated virus vaccines, five reported a loss of 67 in seven herds; with rabbit-origin vaccines, nine reported a loss of 324 in 12 herds; with porcine-origin vaccines, 18 reported a loss of 1,419 in 44 herds; and with the tissue-culture vaccine, which actually has not been used long enough for its effectiveness to be tested, three reported a loss of 66 in six herds.

Again, on a ratio basis (table 1, part C), it would mean that for each hog that supposedly died from cholera more than three weeks after vaccination with the old method, there were about 2.9 such deaths with inactivated vaccines; 2.6 with rabbit-origin vaccines; 7.3 with porcine-origin vaccines; and at least 3 with the tissue-culture vaccine. A complicating factor is that some of the losses reported were in lay-vaccinated herds which the reporter may or may not have been called to treat.

VACCINATION PLANS FOR 1954

Later shifts may occur again, as they did last year when, after estimating the use of the old method on 67 per cent, it was eventually used on only 48.6 per cent, the shift being entirely to the modified live vaccine method. Actually 65 per cent, in this report, had shifted an average of 36 per cent of their 1953 vaccinating away from serum and virus while only 18 per cent had made minor shifts back toward the old method.

Plans for the 1954 vaccination program indicate that this shift will continue but at a reduced pace (table 1, part A). Those making estimates indicate that they will use: the old method on 44 per cent of the pigs they vaccinate; inactivated vaccine on 3.1 per cent; rabbit-origin vaccine with or without serum on 19.3 per cent; porcine-origin vaccine with serum on 30.3 per cent; and tissue-culture vaccine with serum on 3.3 per cent; thus making a total of 52.9 per cent vaccinated with one of the modified virus vaccines.

VACCINATING PREGNANT SOWS

To keep the questionnaire brief, with the hope for more replies, the question on pregnant sows called only for the number vaccinated by each method and whether it did or did not seem to affect their litters. As a result, while many specified the type of trouble and the number of litters affected, others indicated only "bad results" in herds vaccinated with a certain method. The stage of pregnancy when vaccinated usually was not stated. Therefore, the indicated percentages of poor results might be misleading so only the ratio is given (table 1, part D). A total of 12,211 pregnant sows were reported vaccinated.

The abortions, dead or weak pigs, or just bad results reported would indicate that for each such litter in the 27 per cent vaccinated with the old method, there was a ratio of 10 bad litters in the 27 per cent vaccinated with the rabbit-origin vaccines; a ratio of 8 in the 38 per cent vaccinated with porcine-origin vaccines; a ratio of 27 in the 3 per cent vaccinated with the tissue-culture vaccine; and none in the 5 per cent vaccinated with the inactivated vaccines.

OTHER INTERESTING DATA

The trend toward the vaccination of younger unweaned pigs, which was given an impetus by the "variant virus" troubles in 1949 and 1950, continues, 72 per cent reporting that they vaccinated more unweaned pigs than in previous years and only 2 per cent stating that they never vaccinate unweaned pigs.

The report on the delayed use of virulent virus seems favorable, although the condition of pigs when vaccinated was not indicated. However, since the virus usually is delayed only when it would be risky to give it simultaneously, the report of 92 per cent good results, 4 per cent fair, and 4 per cent poor would seem to indicate that the method definitely has merit.

THE INCIDENCE OF CHOLERA

The question concerning the years cholera was most prevalent brought an endorsement for the historians. Of the eight who were in practice in 1913, the record cholera year, 25 per cent reported seeing more cholera then than in any other year. Likewise, of the 44 who were in practice in 1926, the worst year since 1913, 25 per cent named it as their top cholera year. The years most frequently mentioned as cholera years by the younger groups were 1949 and 1951. While 1953 was named as a top cholera year by a few, it was the year most often mentioned, especially by the older practitioners, as being most free of cholera, closely followed by 1952.

This may be significant. While the low incidence of cholera in 1953 may be just a coincidence, it also could mean that the switch away from virulent virus is reducing the opportunity for exposure of susceptible swine. If so, it would be an unmistakable endorsement for nonvirulent vaccines. If the garbage fed to swine is properly cooked, removing that source of cholera, then the incidence of the disease should more or less parallel the quantity of virulent virus used, especially that used by lay vaccinators. Obviously, the effect of such exposure would vary (1) with the concentration of swine in the area; (2) with the number of swine left unvaccinated; and (3) with the degree of immunity produced in those which were vaccinated. Perhaps had cholera been more prevalent in 1953, the immunity record of the various vaccination methods might have been even less favorable.

Another item of interest—several commented that swine erysipelas seemed to occur much more frequently shortly after vaccination when smaller doses or no hog cholera antiserum were used. It was even suggested that some cholera vaccines used with no serum might have sensitized the pigs to erysipelas. This would seem to agree with some European research, where crystal violet hog cholera vaccine has been used to sensitize pigs for erysipelas immunity tests.

If conclusions are to be drawn from the replies and comments, perhaps the chief one would be that hog cholera apparently no longer is the simple, understandable and controllable disease it was thought to be a few years ago. Whether the so-called "variant" viruses of 1949 and 1950 still abound or whether man's attempts to further modify and master the hog cholera virus or viruses has in some way backfired are becoming urgent moot questions.

The accumulated evidence from three annual surveys indicate: (1) that the reaction losses resulting from the use of "nonvariant" virulent virus are less than with modified virus vaccines used alone and little if any greater than with the modified virus vaccines when used with antiserum; (2) that the virulent virus produces the most satisfactory immunity; and (3) that, therefore, its only drawback is that it tends to perpetuate the disease. However, with evidence that the modified vaccines also can regain virulence and produce disease,[1] perhaps the whole field should be resurveyed, including a long, hard look at the inactivated virus vaccines which seem to be the most harmless.

One inescapable conclusion is that no time should be lost in setting up the pilot areas to test the possibility of eradicating hog cholera. If it is becoming more complicated, as the evidence indicates, the disease should, if possible, be eliminated before it develops into a Frankenstein which could be an even more aggravated curse upon the swine industry.

Hog Cholera Reappears in Canada.—The Health of Animals Division, Department of Agriculture, Canada, announced the finding of 2 more cases of hog cholera in Ontario swine in November, and also 2 more cases of rabies in Alberta.

CURRENT LITERATURE

ABSTRACTS

Production of Hyperkeratosis in Calves

The topical application of a commonly used oil-based insecticide carrier by means of hand sprayers produced hyperkeratosis in dairy calves, particularly about the neck and shoulders. This mineral seal oil, a petroleum fraction with no additives, produced a clinical skin condition of similar degree whether or not active insect toxicants were dispersed in the oil at recommended levels (lindane, 0.05%; methoxychlor, 0.5%; and lethane, 3.2% with thanite, 2.3%, both thiocyanate compounds). The hyperkeratosis could be detected within a week and was well established by three weeks after initiation of treatments. The heaviest dosage of mineral seal oil (first three weeks) amounted to about 40 ml. per calf applied three times a week or the equivalent of approximately ¼ oz./100 lb. of body weight per day. Blood plasma vitamin A concentrations were somewhat depressed upon application of the oil or oil-based insecticides, but, in general, they did not reach critically low levels observed when highly chlorinated naphthalene or toxic pelleted feeds (known causative agents of bovine hyperkeratosis) were administered orally. Likewise, the condition produced in this experiment had less effect on the appetite and general well-being of calves than that produced with toxic feeds.—[*W. G. Hoekstra, R. J. Dicke, and P. H. Phillips: Production of Hyperkeratosis in Calves with a Topically Applied Oil-Based Insecticide Carrier. Am. J. Vet. Res., 15, (Jan., 1954): 47-50.*]

Effects of Abnormal Machine Milking on Heifers Free of Mastitis

Eleven first-calf dairy heifers were considered to be mastitis-free after a thirty-day postpartum period of twice weekly studies of leukocyte count, pH and chloride value, and bacteriological examination of the milk. At the thirty-first postpartum day, animals were divided at random into three groups according to inches of vacuum of the milking machine; these were 10, 13, and 17, with 48 pulsations per minute. One-half of each udder was assigned to a normal duration of milking. "Normal" was determined twice weekly as the length of time required to reduce the milk flow to 0.1 lb. per fifteen seconds. The other half was milked for twice the normal duration. The milk was examined twice weekly as mentioned previously.

At 305 days postpartum, animals were slaughtered and histological sections taken of udder and associated lymph nodes. Microscopic changes consisted of (1) focal acute mastitis characterized by heterophils in a few alveoli, followed by involution without appreciable fibrosis — this occurred in seven halves; (2) thelitis characterized by hyperplastic epithelium and infiltration of the lamina propria in two teats. The histological changes were in no way related to the milking duration or high vacuum levels. Log of the leukocyte count, chloride and pH values, and freedom from mastitis organisms showed no significant differences in average response among vacuum levels. In respect to milking time, there was a significant greater mean leukocyte and chloride value for the halves milked at normal duration.—[*C. F. Helmboldt, R. D. Mochrie, W. N. Plastridge, H. D. Eaton, H. L. Easterbrooks, and H. H. Hale: Effects of Abnormal Machine Milking on the Histopathology of Udders of First-Calf Heifers Free of Mastitis. Am. J. Vet. Res., 15, (Jan., 1954): 15-21.*]

Anaplasmosis Complement-Fixing Antibody

The *in vivo* antigenic response to anaplasmosis complement-fixing antigen was determined. The antigenic material consisted of red blood matrices heavily parasitized by *Anaplasma marginale*. The serum obtained in response to a series of intravenous injections of this material was tested for specific anaplasmosis complement-fixing antibodies. This was accomplished by parallel adsorptions with the original anaplasmosis complement-fixing antigen and a control antigen of nonparasitized red cell matrices. Subsequent complement-fixing tests illustrated the removal of the anti-red blood cell antibody, leaving a specific anaplasmosis complement-fixing antibody.—[*James G. Miller: The Production and Identification of an Anaplasmosis Complement-Fixing Antibody. Am. J. Vet. Res., 15, (Jan., 1954): 147-148.*]

Trichomonas Foetus in Diluted Bovine Semen

In 14 trials with *Trichomonas foetus* from cultures, the average duration of survival in egg yolk buffer mixtures with sulfanilamide, penicillin, and streptomycin at 39 F. was 5.9 days. In three trials under similar conditions, except that semen was present and examination for trichomonads was made by the culture method, the average duration of survival of *T. foetus* was 8.7 days, while the average duration of sperm activity was 7.3 days. In seven trials with *T. foetus* from vaginal samples, the average duration of survival was 9.6 days. There was little difference in the duration of survival of trichomonads in the buffer mixtures which contained streptomycin, penicillin, and sulfanila-

mide and those which contained only sulfanilamide. Trichomonads survived for longer periods in culture medium than in the buffer mixtures, for about the same periods in saline solution when cultures were used as the source of trichomonads, but for distinctly shorter periods in saline solution or in undiluted vaginal fluid when trichomonads came from vaginal samples.

The use of semen from an infected bull, diluted 1:15 in egg yolk buffer mixture containing sulfanilamide, streptomycin, and penicillin resulted in no cases of infection in 32 females, and the rate of conception was similar to that for uninfected bulls.—[*Paul R. FitzGerald, Datus M. Hammond, and Merthyr L. Miner: The Survival and Transmission of Trichomonas Foetus in Diluted Bovine Semen. Am. J. Vet. Res., 15, (Jan., 1954): 36-40.*]

Intravenous Administration of Calcium, Potassium, and Magnesium to Calves

Methods of simultaneously recording right intraventricular pressure, electrocardiogram, phonocardiogram, and pneumogram in the dairy calf during intravenous injection are described. Calcium injection (gluconate, chloride) was associated with initial bradycardia but terminal tachycardia and ventricular fibrillation. Atrioventricular block, extrasystoles, and rise in right ventricular systolic pressure were also seen. Potassium injection was followed by intraventricular block and progressive decline in cardiac automaticity until arrest occurred. P waves (on the electrocardiogram) disappeared and intraventricular block was established at 8 mEq. per liter of plasma potassium. Magnesium injection was followed by depression of atrioventricular block and intraventricular condition and respiratory embarrassment. Calcium appeared to antagonize the toxic effects of magnesium, but the reciprocal antagonism did not seem to occur. Effects of Na oxalate administration were opposite to those following Ca injection.—[*E. N. Bergman and A. F. Sellers: Studies on Intravenous Administration of Calcium, Potassium, and Magnesium to Dairy Calves. II. Some Cardiac and Respiratory Effects. Am. J. Vet. Res., 15, (Jan., 1954): 25-35.*]

Ovine and Porcine Penicillin Blood Levels

The administration of a single intramuscular injection of 300,000 units of dibenzylethylenediamine dipenicillin G to sheep weighing 110 to 125 lb. resulted in penicillinemia which persisted for five to seven days; similar injections of procaine penicillin G resulted in penicillinemia for twenty-four to forty-eight hours. The administration of a single intramuscular injection of 200,000 units of dibenzylethylenediamine dipenicillin G to swine resulted in penicillinemia which persisted for two to four days; similar injections of procaine penicillin G resulted in penicillinemia lasting twenty-four to forty-eight hours. Swine given 300,000 units of dibenzylethylenediamine dipenicillin G showed penicillinemia for four to seven days; similar doses of procaine penicillin G produced penicillinemia for two to three days.—[*F. Kral, R. A. Huebner, and H. N. Blumner: Ovine and Porcine Penicillin Blood Levels Obtained with Parenteral Dibenzylethylenediamine Dipenicillin G. Am. J. Vet. Res., 15, (Jan., 1954): 67-70.*]

Chronic Respiratory Disease in Pipped Eggs

Seventy lots of 24 pipped eggs were tested for the presence of the chronic respiratory disease agent. Twenty-nine were positive to embryo passage, 21 were postive to both embryo and inoculation into live chickens and turkeys, and 20 were negative. No definite correlation could be made between the laboratory tests and the health of corresponding broiler flocks.—[*M. S. Cover and E. F. Waller: The Presence of Chronic Respiratory Disease in Pipped Eggs. Am. J. Vet. Res., 15, (Jan., 1954): 119-121.*]

Giardiasis in the Chinchilla

A survey for incidence of Giardia infection at a large commercial chinchilla ranch revealed that 20.95 per cent of the cages housed infected animals. Eight Giardia-free chinchillas were given oral doses ranging from 280,000 to 900,000 Giardia cysts. Giardiasis was established in all animals. Three chinchillas died on or before the end of forty-five days. Descriptions of the symptoms and necropsy findings are given. The prepatent periods for Giardia in the chinchilla ranged from six to eleven days and the encystment cycle was found subject to wide fluctuations. The interval between maximum cyst output usually varied between five and nine days unless the infection was extremely heavy.—[*George C. Shelton: Giardiasis in the Chinchilla. II. Incidence of the Disease and Results of Experimental Infections. Am. J. Vet. Res., 15, (Jan., 1954): 75-78.*]

Neutralization Test for Distemper

A quantitative *in ovo* neutralization test for distemper, using the serial serum dilution-constant virus procedure, is described.

The test was applied to mink and ferret serums collected under various conditions of exposure to distemper virus.

In ferrets vaccinated with egg-adapted distemper virus, circulating antibodies were first detected seven days following vaccination, whereas resistance to virulent virus developed within two days.

Rising titers of antibodies were demonstrated in mink and ferret serums from the seventh to the thirtieth day following vaccination.

Neutralizing antibodies were detected in all serums from a group of nonvaccinated mink that were exposed to distemper-infected ferrets.

Serums collected from animals not previously exposed to the virus exhibited no neutralizing

ability.—[*G. A. Baker, J. R. Gorham, and R. W. Leader: Studies on an in Ovo Neutralization Test for Distemper. Am. J. Vet. Res., 15, (Jan., 1954): 102-107.*]

Blood Picture of Muskrats Under Pentobarbital Sodium

A study of the blood picture of 71 apparently healthy Wisconsin muskrats under pentobarbital sodium anesthesia revealed the following average blood values and standard errors: erythrocytes, 6.33±0.096 million per cubic millimeter; leukocytes, 7.51±0.349 thousands per cubic millimeter; packed volume of erythrocytes, 50.29±0.738 per cent; hemoglobin, 13.65±0.333 Gm./100 ml.; mean corpuscular hemoglobin, 21.61±0.476 μg.; mean corpusclar volume, 79.92±1.391 cμ; and mean corpuscular hemoglobin concentrattion, 27.-16±0.808 per cent.

The differential leukocyte counts revealed the following mean percentages and standard errors: neutrophils, 70.09±1.562; lymphocytes, 24.92±-1.513; monocytes, 2.84±0.225; eosinophils, 0.615; and unclassified cells, 1.66.—[*G. H. Lord, A. C. Todd, and C. Kabat: The Blood Picture of Muskrats Under Pentobarbital Sodium. Am. J. Vet. Res., 15, (Jan., 1954): 79-81.*]

FOREIGN ABSTRACTS

The Schmidt-Evers (Insufflation) Treatment in Human Eclampsia

In 1904, the author (physician and veterinarian) wrote a thesis on comparative pathology entitled, "Contribution to the Study of Lactation Eclampsia; Relation of Bovine Milk Fever to Puerperal Eclampsia in Women." Among the conclusions in this work was the possibility that the two morbid conditions might be analogous in all phases except in magnitude for reasons of specie differences. Further researches were conducted on the etiology and pathology of the two diseases and the mode of actions of the various treatments employed in alleviating the symptoms, with emphasis on the insufflation of air. In 1910, he was rewarded for his work by the Paris Academy of Medicine which presented to him the Tarnier prize.

He developed a technique for intramammary insufflation of air and developed a special instrument for this purpose. Soon after, a healthy young (23-year-old) multiparous woman volunteered to have her breasts inflated with sterile air by Dr. Delmer. Described as a woman of average intelligence, her description of the various reactions encountered during the procedure should be accurate. The only pain felt was during the introduction of the cannula through the nipple. Dr. Delmer states that is is difficult to anesthetize the nipple in human beings. However, the pain would be of no consequence in the eclamptic woman as she is comatose. The patient compared this pain to that of a pin-prick and it stopped when the orifice of the duct had been passed. The inflation and penetration of the breast with air, which caused no discomfort resulted in a tickling or tingling sensation. Crepitation and tympany spread to the corresponding armpit. During the hours that followed, the woman felt a slight burning pain in the inflated breast which reached its peak in two to three hours and ended seven to eight hours later. The air was completely absorbed within forty-eight hours, with no disturbances of any kind to the woman.

The author concludes that, while the Schmidt-Evers treatment is a rather simple procedure in the cow, it is difficult to employ in the human being for anatomical reasons. The complications that might follow such an intervention are also grave. However, should the choice be between death or possible complications, the latter would be preferable.—[*M. Delmer: Concerning the Schmidt-Evers Therapy in the Treatment of Milk Fever and Human Eclampsia. Bull. Acad. vet. France, (April, 1953): 201-206.*]—R.F.V.

Cerebral Angiography

Five papers describe the Portugese methods of injecting the cerebral circulation for radiographic examination of circulatory and neurological abnormalities and for the more exact localization of tumors.

This method gives reliable indications on the operability of various tumors such as gliomas. Angiography can differentiate between many types of benign and malignant tumors as well as defining their extent and localization.—[(1)*Lima, A.: A Historical Study of Angiography, pp. 5-10;* (2) *Marques, A. V., and Ferreira, E. M.: The Angiographic Technique, pp. 11-22;* (3) *Furtado, D., and Ferreira, M.: Aneurisms and other Vascular Malformations of the Brain, pp. 23-78;* (4) *Chichoro, V.; Angiography in Encephalic and Otorhinological Abscesses, pp. 79-100;* (5) *Marques, V.: Cerebral Angiograph of Intracranial Tumors, pp. 101-140. Cadernos Cientificos, Instituto Pasteur de Lisboa., Vol. 3, Sec. 1.*]—J. P. S.

Experimental Botulism in Horses

The authors produced experimental botulism in horses by the feeding or injection of botulism toxin D derived from strain 468 of *Clostridium tetani,* which was isolated from the liver of a horse having succumbed to the disease.

They describe the symptomatology, the course of the disease, and the lesions seen following autopsy. They conclude that the similarity of experimental botulism, *i.e.,* bleeding of the nose, progressive paralysis of the diaphragm, rigidity of the flanks, icteric congestion of visible mucous membranes, postmortem changes, as well as the difficulties encountered in attempting to recover the causative organism and toxin in affected or dead ani-

mals, seem to fit those reported in many cases of equine encephalomyelitis which have been reported in France.

According to the authors, it would seem a good practice to institute prophylactic and therapeutic measures for botulism in outbreaks where laboratory confirmation must be awaited, as this requires a considerably long time and botulism hits suddenly. They also state that bacteriological examination of dead animals should be requested.—[*J. Jacquet and A. R. Prevot: Experimental Botulism in the Horse Produced by Toxin D; Its Symptoms, Pathogenesis, Diagnosis, and Lesions. Bull. Acad. vet. France, (Feb., 1953): 135-140.*]—R. F. V.

Bovine Hereditary Hairiness Defect

In the cattle of central Europe, a "long hair" disease occurs frequently. Because of delayed shedding, the affected animals show a strong dyspnea in summer. Their decreased milk production makes keeping them uneconomical. The genealogical research of Meier has shown that the anomaly is caused by a singular recessive gene. The affected animals should not be used for breeding purposes.—[*Helmut Fischer: Congenital Hairiness a Hereditary Defect in Cattle. Vlaams Diergeneesk. Tijdschrift., 22, (1953): 262-266.*]—L.V.E.

Ovariotomy in Cattle

In heifers, ovariotomy by laparotomy is a common practice in New Zealand. Although the practice of asepsis is not satisfactory, the results are excellent, from which one may conclude that the bovine peritoneum is less sensitive than it is generally believed to be.—[*F. W. J. Swart: On Ovariotomy in Cattle. Tijdschr. voor Diergeneesk., 78, (Oct. 15, 1953): 676-678.*]—L.V.E.

Vaccination Against Newcastle Disease

The authors submit a review of their experience on the vaccination against Newcastle disease over a period of four years. In their opinion, the live Beaudette-Roakin and Hitchner B1 vaccines to be applied in different age groups of poultry are useful in combating Newcastle disease. Their scheme of immunization is as follows: (1) the vaccination of laying hens and chickens (1 day to 6 weeks old) with Hitchner B1 vaccine intranasally; (2) seven days later, vaccination of middle age group (6 weeks to 6 months) by wing-web puncture with Beaudette-Roakin vaccine; (3) poultry treated previously with Hitchner B1 vaccine intranasally are revaccinated after a delay of five months with Beaudette-Roakin vaccine applied intranasally; (4) in the following year, only the young stock (aged 6 weeks to 6 months) is vaccinated by wing-web puncture with Beaudette-Roakin vaccine. The vaccine viruses proved to be of a mild and stable nature.—[*G. M. Van Waveren and D. M. Zuijdam: Concerning the Vaccination Against Pseudofowlpest. Tijdschr. voor Diergeneesk., 78, (July 15, 1953): 577-587.*]—L.V.E.

The Spleen of Newborn Calves

The author gave consideration to the question, "Is the spleen of normal newborn calves always sterile?" Ten bacteriological examinations were made on each of ten spleens, with the development of bacteria in 20 cases; 2 in pure culture (*Escherichia coli*) and other bacteria which were not further examined.—[*C. J. G. Van der Kamp: On the Bacteriological Examination of the Spleen of Newborn Calves. Tijdschr. voor Diergeneesk., 78, (Oct. 15, 1953): 879-881.*]—L.V.E.

Bovine Infectious Pneumonia

A description is submitted of a farm where, in the course of a few days, 5 young cows developed a high temperature as well as disturbances of respiration. The animals which first became ill developed a distinct pneumonia. When therapy with sulfonamide preparations and antibiotics was applied, all animals recovered. In the laboratory of the Animal Health Service in Overijssel, *Pasteurella hemolyticus* could be isolated in pure culture from the blood of 1 of the sick animals. No predisposing cause of this outbreak was indicated. —[*A. Stevens: On Infectious Pneumonia in Cattle. Tijdschr. voor Diergeneesk., 78, (Oct. 15, 1953): 870-872.*]—L.V.E.

Studies on Dilution and Preservation of Canine Semen

The semen was obtained by masturbation and only the second collections were used. It is claimed that the second fraction is of testicular origin and is practically free from the accessory secretions which are not conducive to artificial longevity of sperm. The diluents used were made of equal parts of fresh egg yolk and sodium citrate or fructose of varying concentrations. The best results were obtained with a hypotonic solution of sodium citrate and egg yolk and with the egg yolk combined with fructose, providing the solution was hypotonic. It is believed that the favorable action of these diluents is due to their low Na^+ content.—[*M. Brochart and J. Coulomb: Reserches sur la dilution et la conservation du sperme de chien. Bull. Acad. vet. France, (Feb., 1952): 59-62.*]—R. F. V.

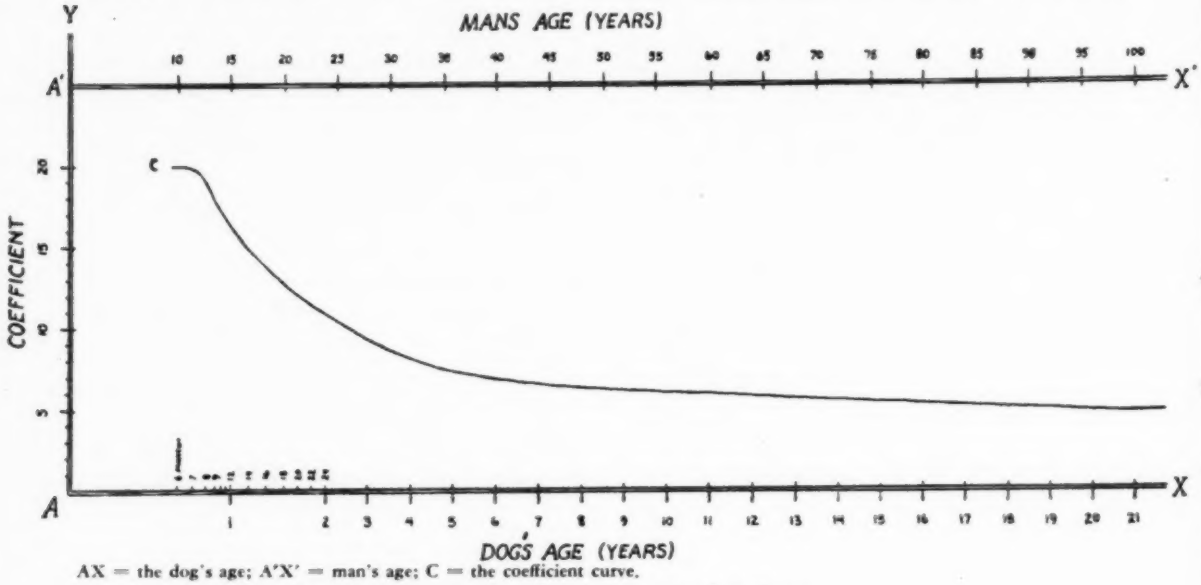
1954 AVMA Directory Available with Hard Covers

This indispensable encyclopedia of veterinary information is now available in a cloth-bound edition at $3.50 per copy. The standard paper cover is $2.50 per copy (member prices).

Age Comparison Between Man and Dog

The general public has been led to believe that a dog's age can be compared to man's by the use of a fixed number (coëfficient) applicable during the entire life of the animal. This is erroneous as the coëfficient changes considerably during the life span. If age of puberty, appearance of senility, and the diseases incident to it are compared in both species, it is possible to construct a graph, as shown in figure 1.

From figure 1 it will be observed that six months of life in the puppy is equivalent to ten years in the infant (coëfficient 20). The period from 6 to 13 months in the dog is compared to 10 to 13 years in man, this being the age of puberty in both species. A 4-year-old dog will compare to a 32-year-old adult (coëfficient 8). The 16-year-old dog is as old as the human octogenarian (coëfficient 5). Table 1 has been derived from figure 1, showing equivalent ages and the change in the coëfficient.—[*A. Lebeau: L'age du Chien et celui de l' Homme, Essai de Statistique sur la Mortalite Canine. Bull. Acad. vet. France, (April, 1953): 229-232.*]—R.F.V.



AX = the dog's age; A'X' = man's age; C = the coefficient curve.

Fig. 1—Graph comparing the dog's age to that of man.

TABLE 1—The Equivalent Ages of Dog and Man, and the Change in Coefficient (Based on Fig. 1)

Dog's age	Coefficient	Man's age
6 months	X 20.0	10 years
7 months	X 20.0	11 years 8 months
8 months	X 19.0	12 years 8 months
9 months	X 18.0	13 years 6 months
10 months	X 17.0	14 years 2 months
11 months	X 16.0	14 years 8 months
12 months (1 yr.)	X 15.0	15 years
14 months	X 14.5	16 years 11 months
16 months	X 14.0	18 years 8 months
18 months	X 13.5	20 years 3 months
20 months	X 13.0	21 years 8 months
22 months	X 12.5	22 years 9 months
24 months (2 yr.)	X 12.0	24 years
3 years	X 9.3	28 years
4 years	X 8.0	32 years
5 years	X 7.2	36 years
6 years	X 6.6	40 years
7 years	X 6.3	44 years
8 years	X 6.0	48 years
9 years	X 5.8	52 years
10 years	X 5.6	56 years
11 years	X 5.4	60 years
12 years	X 5.3	64 years
13 years	X 5.2	68 years
14 years	X 5.1	72 years
15 years	X 5.06	76 years
16 years	X 5.0	80 years
17 years	X 4.9	84 years
18 years	X 4.87	88 years
19 years	X 4.84	92 years
20 years	X 4.80	96 years
21 years	X 4.76	100 years

BOOKS AND REPORTS

The Veterinary College, Hannover, 1778-1953

The chronicle of the Veterinary College in Hannover gives a vivid picture of the rise of this famous school and of 175 years of veterinary education. In the introductory chapter, we become familiarized with the conditions in the livestock industry at the middle of the eighteenth century that led to the demand for schools for the training of competent veterinarians. These conditions were similar to those that brought about the demand for trained veterinarians in the United States some one hundred years later. The next chapter tells of the

founding of the college and its administration under the first director. The following chapters describe the school under succeeding directors and their struggles for funds to improve buildings and equipment, not unlike the struggle of the deans of our veterinary colleges to obtain appropriations for maintenance and expansion of our schools. In spite of adversities, the newly fledged veterinary college grew and swiftly became a recognized leader among the European veterinary schools.

The fascinating narration of the accomplishment of the aims and hopes of this famous school is interspersed with biographies of about 30 of the elite of German veterinary teachers. In addition, there are 66 photographs of past and present teachers and 28 illustrations.

The book is divided into two sections, the chronicle proper, and the festal memoir, describing the school under its new constitution. It is printed on good quality paper and has an attractive cover. All in all, it is a masterpiece of veterinary historical writing.

In this connection it may not be amiss to recall that in 1908, in his address, "The Making of American Veterinary History," Dr. Hughes stated: "We have been barren in the writing of biography and autobiography. The lives of many learned American physicians have been written. I do not know of a single well-executed biography of any American veterinarian. We have been barren in the narration of the course events have taken, which have carried forward to success great movements for our good."

So far, this challenge has not been taken up in the United States to its fullest possible potentialities.—[*Die Tierärztliche Hochschule in Hannover 1778-1953 (The veterinary college in Hannover, 1778-1953). 413 pages. M. & H. Schaper, Hannover, Germany. 1953. Price about $6.00.*]—F. VOLKMAR.

Surgical Principles and Technics

This is the second edition of a text on the fundamental principles and practical aspects of surgery of interest both to veterinary students and practitioners. It has 53 more pages than the first edition, 22 of which are devoted to a dozen small animal surgical conditions and 31 to large animal or general subjects. With 103 added figures it is well illustrated.

New small animal procedures discussed include castration of the rabbit, dental fistula, nephrectomy, amputation of the penis, mammectomy, diaphragmatic hernioplasty, pulmonary lobectomy, debarking, otitis media, fractures, and fascia transplants in the dog and cat.

Large animal features added include discussions of pentothal and intravenous anesthesia, severed tendon braces; costal, flank, and perineal fistulas; salivary cysts and calculi, various bone and soft tissue tumors, dentigerous cysts, reproductive tract abnormalities, arthritis, thrombosis, and restraint.

Many of the above conditions are presented as case reports through which the application of fundamental surgical methods are well illustrated.

The author's long, practical experience and the fact that he was one of the very first veterinary surgeons to rigidly employ the principles of asepsis adds to the value of his opinions and methods.

This text is singularly free of theory, being based chiefly upon the author's observations and experience. It makes interesting reading and has many valuable suggestions for practitioners as well as students.—[*Surgical Principles and Technics. By W. F. Guard. 239 pages (8½ x 11). 201 illustrations. W. F. Guard, 2274 Yorkshire Road, Columbus 21, Ohio. 1953. Price $7.50.*]

Literature on Foot-and-Mouth Disease

These three volumes contain a worth-while compilation in Spanish of work on foot-and-mouth disease published in a large number of journals from several countries. Most of the articles have also been published in the *Bulletin de l'Office international des Epizooties* from 1927 to 1938. No new work appears, but the three volumes are valuable for the Spanish reader in bringing together in three handy volumes the literature on foot-and-mouth disease which has been scattered through numerous volumes of the *Bulletin.*

Dr. Martinez's work in assembling this material should prove to be a valuable bibliographic aid to all workers in the field.—[*Recopilacion Documental sobre Fiebre Aftosa. By Carlos Ruis Martinez. Official publication of the Venezuelan Ministry of Agriculture, Caracas, Venzeuela, 1952. Price not given.*]—M. S. SHAHAN.

The Concept of Disease — Its History, Its Versions and Its Nature

This is an analysis of the evolution of our present conceptions of disease. It is shown that, although disease is a basic experience of human existence, each stage of civilization has had its own concepts thereof.

More than a dozen "conceptions of disease" are discussed including the stoic, the cosmological, the moral, the Hippocratic, and on through the etiological, the psychological to the metaphysical.

The discussions are too brief to more than suggest a pattern. The text is of more historical than practical value. Veterinarians will find little that will interest them.—[*The Concepts of Disease. By Walter Riese, M. D. 115 pages. No illustrations. The Philosophical Library, 15 East 40th St., New York, N. Y. Price $3.75.*]

Geese and Grass.—On a California cotton farm it is estimated that 3 geese to the acre will keep down grass. A goose does $5 worth of weeding a year, while producing edible goose flesh.—*World's Poult. Sci. J., Oct.-Dec., 1953.*

THE NEWS

Ninety-First Annual AVMA Convention
Seattle, Aug. 23-26, 1954

Facts About the Convention City

Seattle, chief city of the State of Washington and largest city of the Pacific Northwest, has unique attractions for convention goers. Situated on a series of hills above its fine harbor, its surroundings have great natural beauty. To the west, across Puget Sound, rises the jagged sierra of the Olympics; to the east, is fresh-water Lake Washington, backed by the Cascade Mountain range; to the south, rises snow-capped Mount Rainier. Within the city, which has about 70 square miles of land area and 36 square miles of water, are Union and Green lakes.

Seattle was founded in 1852 by 21 white settlers and takes its name from a friendly Indian chief. As the county seat with a population of about 400, it was attacked by Indians in 1856 but was successfully defended by the U. S. sloop-of-war "Decatur." With the coming of the first railroad in 1884, the city grew rapidly but suffered a destructive fire in 1889 which burned most of its buildings. The discovery of gold in Alaska in 1897 and the "rush to the Yukon" changed Seattle almost overnight into an important commercial center where prospectors were outfitted and the port to which they shipped their gold.

The first steamship from the Orient arrived in 1896, marking the beginning of much foreign trade; this was greatly stimulated by the opening of the Panama Canal in 1914. During World War I, Seattle built more ships in its great yards than any other port in the United States. During the Korean war, the heart-warming welcomes to returning veterans by the people of the city, with bands, orchestra music, and the famous singing and dancing chorus, were thrilling events to witness.

Seattle has many points of interest such as the University of Washington whose campus includes the former site of the Alaska-Yukon Pacific Exposition held in 1909-1910; the Lake Washington Floating Bridge, built on huge pontoons, 6,560 ft. long and 60 ft. wide; a public market which is said to be the most colorful farmer's market in the nation; the second largest locks in the Americas,

A "big haul" just off shore from Seattle, the 1954 AVMA convention city.

An aerial view of the City of Seattle taken from Queen Anne Hill. Mount Rainier can be seen in the background. The annual meeting of the AVMA will be held in Seattle on August 23-26.

connecting Puget Sound with Lakes Washington and Union; several beautiful parks, fine stores, and excellent restaurants.

HOTEL RESERVATIONS

Requests for hotel accommodations for the 1954 AVMA convention should be sent to the Housing Bureau, using the reservation blank which will be found, together with a location map, on advertising pages 50 and 51.

WATCH FOR TOUR ANNOUNCEMENT

A special leaflet, giving information about the tours to be offered by the AVMA in collaboration with Happiness Tours, Inc., will be mailed to members in the near future. There will be a trip to Seattle with stopover in Jasper Park; a side trip to Skagway, Alaska, for those who want such an extension, and choice of three return routes: via the Canadian Rockies; via San Francisco, Los Angeles, and the Grand Canyon; and via Portland and Denver.

Foreign Veterinary Colleges Evaluated by the AVMA Council on Education

The Council on Education of the American Veterinary Medical Association recommends that veterinary institutions and organizations in the United States and Canada consider all past and current graduates of the following listed foreign veterinary colleges on an equal basis with graduates of approved veterinary colleges in the United States and Canada.

Inclusion of a foreign veterinary college in this list does not constitute official accreditation or approval by the Council on Education of the AVMA, since its jurisdiction is limited to the United States and Canada.

This list of recognized foreign veterinary colleges is published for advisory purposes only. It is a partial list and will be augmented and revised at such times as additional data are obtained and evaluated by the Committee on Foreign Veterinary Colleges of the Council on Education. Omission of the name of a foreign veterinary college from the list should not be interpreted as disapproval of that college, but in many instances it indicates that the data available on that college are insufficient or too incomplete to permit an accurate evaluation.

Publication of the following list was authorized at the meeting of the Council on Education on May 25, 1953. The list supersedes that previously published in the JOURNAL (March, 1953: 241-242).

1) *Australia*
   Veterinary College, University of Sydney.
2) *Austria*
   The Vienna Veterinary College, Vienna (for graduates in 1952 and years subsequent thereto).
3) *British Isles*
   Members of the Royal College of Veterinary Surgeons* who are graduates of only the following named colleges:
   a) The Royal Veterinary College, London and Streatley.
   b) The Royal (Dick) Veterinary College, Edinburgh.
   c) The Glasgow Veterinary College, Glasgow.
   d) The Veterinary College of the University of Liverpool.
   e) The Royal Veterinary College of Ireland, Dublin.

(*Continued on page* 241)

***The Royal College of Veterinary Surgeons is not a college in the sense in which the term is used in North America. It is a licensing agency chartered by the government to which members are admitted only after having graduated from approved veterinary colleges and after having passed veterinary professional examinations.**

News From Washington

Preliminary reports on U.S.D.A. budget estimates for 1955 indicate that the Department is asking Congress to approve appropriation increases of approximately $2,500,000 for research under ARS, 5.7 million for payments to state experiment stations, and 8.3 million for the extension service, with the increased amounts made up principally by payments to states. At the same time, reductions in appropriations for certain items are in the U.S.D.A. budget, including a reduction of $2,785,000 for work on plant and animal disease and pest control. Included in this reduction is an amount of approximately $650,000 which the Department says they will not need since they no longer intend to furnish federal indemnities in support of tuberculosis and brucellosis eradication campaigns.

★ ★ ★

The interprofessional conference sponsored by the **American Pharmaceutical Association,** held in Washington on February 4, recommended the establishment of a continuing committee to be composed of a representative from each of the allied health fields to give further consideration to the problems dealing with the production, distribution, and administration of drugs. No formal resolutions were adopted by the conference; however, there was a general recognition of (1) a need to explore these problems; (2) the resolution of existing problems must be considered at both the local and national level; (3) there is a need for a clearer expression of the responsibilities of the individual; (4) any action on the part of the participating members of the conference must strike a balance somewhere between a "do-nothing" and an "idealistic" position (see AVMA Report, adv. p. 8).

★ ★ ★

The Senate has passed and sent to the House of Representatives a bill providing for the payment of **federal indemnities for hogs** destroyed because of vesicular exanthema in July, 1952, prior to the declaration of emergency which permitted federal-state indemnities on VE-infected hogs.

This bill, if passed in the House and signed by the President, will permit the payment of federal indemnity to match the sum already paid by the State of Oregon.

★ ★ ★

A subcommittee to **study purchasing and handling of food** and other supplies for all government operations, including the Defense Department, has been organized by the Hoover Commission. The chairman is Joseph P. Binns, a New York hotel executive. The findings of this task force on subsistence service will be of special interest to veterinarians within the Armed Forces.

★ ★ ★

The report of the chief of the Bureau of Animal Industry (1953) can be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. The report is a 123-page summary of all phases of research and regulatory activity by the Bureau.

★ ★ ★

The AVMA Washington office was recently informed that three companies producing and distributing veterinary drugs and biological products had submitted what the Food and Drug Administration considers a set of adequate instructions which would permit the interstate shipment of **drugs for sale to,** and their **intravenous and parenteral injection by, others than veterinarians.**

All information available regarding this subject has been referred to the Board of Governors and to the newly appointed AVMA Special Committee on Veterinary Supply Problems.

(*Continued from page 239*)

4) *Denmark*
Royal Veterinary Agricultural College, Copenhagen.

5) *France*
a) National Veterinary College at Alfort, Alfort.
b) National Veterinary College at Lyon, Lyon.
c) National Veterinary College at Toulouse, Toulouse.

6) *Germany*
a) Hannover Veterinary College, Hannover (for graduates in 1950 and in years subsequent thereto).
b) Bavarian Ludwig-Maximilian University, Munich (for graduates in 1953 and in years subsequent thereto).

7) *Netherlands*
Royal University of Utrecht, Utrecht.

8) *Norway*
Royal Veterinary College, Oslo.

9) *South Africa*
University of Pretoria (formerly Transvaal University), Onderstepoort.

10) *Sweden*
Royal Veterinary College, Stockholm.

The following veterinary colleges had distinguished faculties and maintained high standards prior to 1939. The Council recommends that graduates of the following colleges during and prior to 1939 be accorded the same recognition as graduates of the colleges named above.

1) *Germany*
a) Freiderick-Wilhelm's University, Berlin.
b) Hannover Veterinary College, Hannover.
c) University of Leipzig, Leipzig.
d) Bavarian Ludwig-Maximilian University, Munich.
e) Justus Liebig College for Agriculture and Veterinary Medicine, Giessen.

2) *Hungary*
Hungarian University of Agricultural Sciences, Budapest.

British Caribbean Veterinary Association to Meet in Trinidad Next May

Dr. Stephen P. Bennett (COL '48) is chairman of the Organizing Committee for the next meeting of the British Caribbean Veterinary Association which will be held in Port-of-Spain, Trinidad, British West Indies, May 24-27, 1954. Veterinarians from the United States are cordially invited to attend.

On May 28 and 29, the Organizing Committee has planned postconvention trips to points of interest on the Island. Round-trip plane fare from New York to Trinidad is $282 (12 hours flying time) and hotel accommodations at the best hotel on the island may be had for $9.00 per day with meals.

AVMA Research Fellowships Available

The Research Council of the American Veterinary Medical Association announces the availability of a number of fellowships for postgraduate training for the academic year, 1954-1955.

The recipient of a fellowship must be a veterinarian and a citizen of the United States or Canada. Veterinary students who expect to graduate at the end of the current school year may apply for a fellowship. The latest date for filing the completed application form is April 1, 1954.

The Committee on Fellowships of the Research Council will meet in April to consider applications and the awards will be announced not later than May 15. The stipend will be determined in each case by the needs of the individual, the location of the school where he proposes to work, and other factors. In general, the stipends range from $100 monthly and upward.

Any qualified person interested in graduate training may obtain application blanks and other information by writing to Dr. Robert Getty, secretary, AVMA Research Council, Department of Anatomy, Iowa State College, Ames, Iowa.

STUDENT CHAPTER ACTIVITIES

Illinois Chapter.—At the regular January meeting of the University of Illinois Student Chapter of the AVMA, **Dr. Karl E. Gardner,** of the Department of Dairy Science, discussed problems of the dairy cow before and after parturition.

During the business meeting, the following officers were elected: James Nadler, president; John Clayton, president-elect; Walter Zuchlag, vice-president; James Fitzgerald, secretary; and J. Stanley Larsen, treasurer.

s/NORMAN JONES, *Retiring Secretary.*

• • •

Iowa Chapter.—The annual "medicine ball," sponsored by the junior class veterinary medical students, was held on January 9. Much of the credit for its success goes to Co-Chairmen Robert McClure and Robert Watson.

The winter smoker, held on February 10, was also a huge success. Activities for the evening included a short informal program, followed by the election of officers for the coming school year.

s/HOWARD E. BAYLES, *Secretary.*

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Missouri Chapter.—The University of Missouri Student Chapter of the AVMA held its last regular meeting of the fall semester on January 11 at the clinic. The speaker of the evening was **Dr. Raymond Fagan,** M.D., of the Communicable Disease Center in Kansas City. Dr. Fagan spoke and showed films on rabies, and then answered questions of chapter members.

The following officers were elected for the

second semester: Bill Monsees, vice-president; Fon Owings, president-elect; Anderson Snell, secretary; and John Boyer, treasurer.

s/JAMES BOZARTH, *Retiring Secretary.*

• • •

Washington Chapter.—The meetings of the fall semester of the Washington State College Student Chapter of the AVMA were all interesting and well attended. The big function of the year, of course, was the annual hobo dance, held on November 21.

On November 17, at the regular meeting, **Dr. R. E. Morton,** M.D., spoke on several diseases common to both human and veterinary medicine. At the December 1 meeting, Dean Stone presented the Borden Award to Senior Don Sather. Dr. Bob Leader was elected faculty advisor for the coming year.

At a special meeting, on December 11, of the students and faculty of the veterinary school, **Dr. Leo Bustead,** head of biological research at the Hanford Atomic Energy Project, gave an interesting and enjoyable talk. At a recent meeting, **Dr. Russell Gillespie** and **Mr. Fred Williams** were given honorary membership in the Student Chapter by a vote of the members.

On December 15, **Dr. C. G. Andrist,** of Chewelah, Wash., gave a talk on large animal practice. Officers for the coming year were also nominated at this meeting. On January 12, **Dr. Shaw,** head of the Washington State College Department of Dairy Husbandry, gave a pertinent talk on veterinary public relations. New officers for the Student Chapter were elected for the coming year. They are: James Dow, president; Wynn Dale, vice-president; Dorthy Hamilton, secretary; Bruce Stucki, treasurer; Jerry Harsch, publicity chairman; and Charles Schroeder, athletic chairman.

s/W. D. BOHLKE, *Publicity Chairman.*

WOMEN'S AUXILIARY

The AVMA Research Fund and the Auxiliary.—According to statistics furnished me by Mr. R. Rongren, director of AVMA membership services, 28 state and regional auxiliaries have contributed $1,302 to the AVMA Research Fund. This is an excellent start—but only that.

If this fund is to be active and continue to grant fellowships, it must have the interest and financial support of all units of the AVMA and the women's auxiliaries.

So far, 23 fellowships have been granted, involving an expenditure of $69,832.

When the Research Fund was started in 1946, the AVMA launched a campaign to its members only. They contributed so generously that no requests for financial aid were made for a number of years. Meanwhile fellowships were being granted for research in veterinary medicine.

Finally, the fund was depleted to the point where contributions were most necessary if it were to continue. At this time, it was decided to appeal to the AVMA Women's Auxiliary to take over the fund-raising as one of its projects.

We are all well aware of the importance of research in other fields to stamp out disease. We are constantly being presented with information and requests for contributions to funds for research in medicine.

The need for research in veterinary medicine is as great and as important. However, we do not have the facilities to put on a national campaign of such magnitude. So we must rely on the men and women directly connected with veterinary medicine to fill the coffers of our Research Fund. This fact makes it necessary that we all contribute as generously as possible.

While there are no facts to support this belief, we feel that probably all the contributions from auxiliaries have come directly from their treasuries. These contributions are well appreciated, but do not make the public aware of the work in the field of research in veterinary medicine.

There is a way that our need can be more widely known. That is for our auxiliaries to have specific projects to raise money for the fund. If you would sponsor some kind of activity in your community, providing residents, other than wives of veterinarians, an opportunity to participate, then you are also indirectly engaging in a public relations job for the profession. For example, if you sponsored a bake sale, or a bazaar, by explaining and publicizing where and how the proceeds will be used, you are making your community aware of the importance of veterinary research.

The Research Fund-Raising Committee has recommended that research funds be solicited on an annual basis beginning in 1955. With this thought in mind, perhaps the auxiliaries throughout the country can start to give some thought to planning a research fund-raising campaign in their respective areas.

s/MILDRED K. RICHARDSON, *President-Elect.*

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Kansas City Auxiliary.—The Women's Auxiliary to the Kansas City Veterinary Medical Association met at the Hotel Continental on Dec. 15, 1953. The Reverend Donald McKay, of the First Christian Church of Independence, Mo., told the "Anniversary Story" by Margaret Sangster. Mrs. W. H. Mowder, a member of the Auxiliary, presented a most interesting display of Christmas novelties and gift-wrapping ideas. This was the annual Christmas party with a gift exchange and refreshments of home-made candies.

During the business session, the following officers were elected: Mrs. K. M. Curts, Kansas City, Kan., president; Mrs. E. L. Montgomery, Belton, Mo., vice-president; Mrs. C.

M. Cooper, Edwardsville, Kan., recording secretary; Mrs. W. W. Wempe, Lawrence, Kan., treasurer; and Mrs. F. O. Cox, Holton, Kan., corresponding secretary.

The following were hostesses for this meeting: Mrs. Glen Dunlap, Mrs. Busch Meredith, Mrs. W. H. Mowder, and Mrs. F. O. Cox.

s/MRS. F. O. COX, *Corresponding Secretary.*

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Wisconsin Auxiliary.—The Women's Auxiliary to the Wisconsin Veterinary Medical Association held its annual winter meeting at the Hotel Schroeder in Milwaukee on Feb. 4-6, 1954.

Events planned for the women consisted of a luncheon in the Empire Room of the Hotel, on February 5, during which a style show was presented; a business meeting and program on the same day; and a coffee-and-rolls hour on Saturday morning, preceding the annual election of officers. The feature of the program was a talk by Mrs. S. K. Andreassen, Menomonie, on her trip to the International Veterinary Congress in Stockholm last summer. During the business meeting, Mrs. Elmer A. Woelffer, Oconomowoc, who was the delegate of the Wisconsin V.M.A. Women's Auxiliary to the AVMA Convention in Toronto last summer, gave a report on the convention.

The women also joined their husbands at a family get-together in the Pere Marquette Room of the Hotel on Thursday evening, and at the Banquet in the Crystal Ballroom on Friday evening.

Committee chairmen for Women's Activities were: Mrs. Charles Gurneau, Kenosha, general chairman; Mrs. Frank Gentile, Milwaukee, luncheon; Mrs. Walter F. Johnson, Janesville, registration; Mrs. Glenn Downing, Waukesha, hospitality; Mrs. Arthur E. Moats, Cedarburg, publicity; Mrs. Walter M. Johnson, Plymouth, nominating committee.

s/MRS. ALTON I. MOYLE, *Secretary.*

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Ontario Auxiliary.—The Women's Auxiliary to the Ontario Veterinary Association held their ninth annual meeting in the Royal York Hotel, Toronto, Ont., on Jan. 15, 1954. At the business meeting, presided over by President Miss Eileen Kealey, Ottawa, the Auxiliary voted to send a donation of $50 to the Student Loan Fund, Mrs. Gwatkin, Ottawa, reported on the Women's Auxiliary to the AVMA meeting in Toronto, and Miss Eileen Kealey reported on the Ladies Auxiliary to the Canadian V.M.A. meeting in Toronto.

Mrs. Lewis, Ottawa, was appointed delegate to the 1954 Canadian V.M.A. convention in Ottawa; and Mrs. Gwatkin, with Mrs. MacDonald as alternate, was appointed delegate to the house of representatives of the Women's Auxiliary to the AVMA for the 1954 convention in Seattle.

The following officers were elected for the ensuing year: Mrs. T. W. Hawke, Cobourg, president; Mrs. R. H. Wright, Dundas, first vice-president; Mrs. J. C. Dancey, Aylmer, second vice-president; Mrs. S. T. Bodendistel, Stouffville, secretary; and Mrs. W. C. Holden, Pembroke, treasurer.

Officers of the Women's Auxiliary to the Ontario Veterinary Association are (left to right): Mrs. S. T. Bodendistel, secretary; Mrs. T. W. Hawke, president; Mrs. R. H. Wright, first vice-president; and Mrs. J. C. Dancey, second vice-president. Mrs. W. C. Holden, treasurer, was not present when the picture was taken.

The social activities of the convention included a French-style buffet luncheon at the St. Regis Hotel, a tour of Christie Biscuit factory, and an evening of bingo.

s/(MRS. S. T.) MARIE BODENDISTEL, *Secretary.*

APPLICATIONS

Applicants — Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative By-Laws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent associations shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. This certification was made by the secretary of the constituent association in accordance with Section 2, Article X, of the Administrative By-Laws.

First Listing

FAGER, HUMMEL C.
Rd. 6, Carlisle, Pa.
V.M.D., University of Pennsylvania, 1953.

LEE, WILLIAM K.
1034 Willow Lane, Pocatello, Idaho.
D.V.M., Colorado A. & M. College, 1953.

MASSEY, JOSEPH R., JR.
4229 Van Buren, Arlington, Calif.
D.V.M., Kansas State College, 1939.

GIBBENS, ROY
c/o Crown Crest Farm, Newtown Pike, Lexington, Ky.
D.V.M., Texas A. & M. College, 1950.

KRAMER, MORTIMER
113 Walt Whitman Rd., Huntington Station, N. Y.
D.V.M., Middlesex Veterinary College, 1945.

Applicants — Not Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative By-Laws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., notice of all applications from applicants residing outside of the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, school, and year of graduation, post office address, and the names of his endorsers.

First Listing

ANTHONY, WALLACE L.
4735 E. Marginal Way, 6006 ASU., Vet. Detach., Seattle, Wash.
D.V.M., Kansas State College, 1945.
Vouchers: N. F. Christensen and R. McNellis.

LIEBERMAN, JAMES
3426 Tulane Dr., West Hyattsville, Md.
D.V.M., Middlesex Veterinary College, 1944.
Vouchers: F. A. Todd and J. H. Hempy.

MALDONADO, GUILLERMO
Calle 75, No. 22-20, Bogota, Colombia, S.A.
D.V.M., National School of Veterinary Medicine, Bogota, Colombia.
Vouchers: J. A. Villamil and D. Pacheco-Perez.

ROJAS, MAXIMO G.
Hotel Junin, Ganadera Dept., La Oroya, Lima, Peru.
D.V.M., National Veterinary College, Lima, Peru, 1952.
Vouchers: D. F. Watson and M. O. Veliz.

SHIFFMAN, MORRIS A.
Wissahickon Gardens, Apt. 14-B, Philadelphia, Pa.
D.V.M., National Veterinary College, Alfort, France, 1949.
Vouchers: S. C. Mount and K. G. Nicholsen.

WITTROCK, JACK E.
316 Haight, Alameda, Calif.
D.V.M., Washington State College, 1937.
Vouchers: R. McNellis and J. E. Reid.

Second Listing

GRUMBLES, LELAND C., Arctic Aeronautical Laboratory, APO 731, c/o PM Seattle, Wash.

LUKER, CHARLES T., 71st Medical Detachment VFI, APO 19, c/o PM, New York, N.Y.

YOUNG, JAMES B., 124th Surgical Hospital, APO 174, c/o PM, New York, N.Y.

U. S. GOVERNMENT

U. S. D. A. Veterinary Student Employment.—A program for the employment of veterinary student trainees was announced some time ago by the Agricultural Research Service, U. S. D. A. The trainees will receive probationary appointments eventually leading to permanent civil service status. Those selected will be on duty from the end of the school year until the beginning of the next school year. Employment will be in grade GS-5 at a salary of $3,410 per year. They will assist veterinarians of the Service in conducting various activities, such as animal disease control and eradication, federal meat inspection, supervision of the manufacture of virus and serum, and inspection of public stockyards. When the trainee resumes service upon graduation, he will be better trained to step into immediate production as a full-fledged professional employee.

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Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U.S.D.A. Agricultural Research Service, formerly the Bureau of Animal Industry, are reported as of Jan. 8, 1954.

NEW APPOINTMENTS

Robert W. Boisclair, Milwaukee, Wis.
William L. Boone, Los Angeles, Calif.
James H. Brink, Sioux City, Iowa.
Jonas R. Brooks, Fort Worth, Texas.
Raymond J. Brugger, Kansas City, Kan.
Cornelius A. DeValois, Tampa, Fla.
Amos D. Dillard, Moultrie, Ga.
Herschel D. Dorman, Mexico City, Mex.
James C. Dunlop, St. Louis, Mo.
Vladimirs Filatovs, St. Louis, Mo.
John J. Garvey, Augusta, Maine.
George P. Hickman, San Francisco, Calif.
Edward J. Hills, Mexico City, Mex.
Robert W. Holbert, Mexico City, Mex.
Ray E. Hughes, Denver, Colo.
Orello F. Hunter, Mexico City, Mex.
William K. Hunter, Mexico City, Mex.
Klemens F. Johnson, Spokane, Wash.
Edgar L. Judy, Jr., Mexico City, Mex.
Sheldon Z. Keevak, Mason City, Iowa.
Bruno Leparskas, Omaha, Neb.
Walter Meyers, New York, N. Y.
Antanas Niksas, Sioux City, Iowa.
Murry E. Numery, Atlanta, Ga.
Julius H. Ozolins, Waterloo, Iowa.
Alvin D. Rees, Mexico City, Mex.
Warren B. Ross, Mexico City, Mex.
Euclid C. Sharman, Mexico City, Mex.
Juozas Skaudys, Evansville, Ind.
Frarie C. Smalley, Mexico City, Mex.
Hubert L. Smith, Kansas City, Kan.
William R. Streeter, Los Angeles, Calif.
James R. Vacietis, San Francisco, Calif.
Willard G. Walter, Mason City, Iowa.

MILITARY FURLOUGH

Martin Kagan, Clayton, N. Y.

SEPARATED (No return from military furlough)

Roland J. Gibbs, Waterloo, Iowa.

DEATHS

John W. Brown, Cleveland, Ohio.
John A. Roberts, Sacramento, Calif.

RESIGNATIONS

Robert P. Armstrong, Columbus, Ohio.
William E. Beavers, Columbus, Ohio.
William L. Black, Jr., Mexico City, Mex.
Franklin W. Bredahl, Des Moines, Iowa.
Floyd W. Frank, Portland, Ore.
Robert F. Gentry, East Lansing, Mich.
George P. Hickman, San Francisco, Calif.
Ralph V. Kelling, Denver, Colo.
Paul D. Lampru, Montgomery, Ala.
Raymond A. Minor, Ottumwa, Iowa.
Charles E. Moon, Olympia, Wash.

Arthur H. Peck, Baltimore, Md.
Robert N. Richardson, Mexico City, Mex.
Robert E. Scott, Louisville, Ky.
Warren J. Shay, Billings, Mont.
George C. Sturges, Augusta, Maine.

RETIREMENTS

Clifford M. Aamoth, St. Paul, Minn.
John J. Ash, Albany, N. Y.
Vern C. Bartlett, St. Louis, Mo.
Scott A. Burnam, Fort Worth, Texas.
David F. Eggers, Nashville, Tenn.
Joseph W. Etheridge, Sioux City, Iowa.
Wilber C. Finn, Kansas City, Kan.
Leslie J. Howell, Kansas City, Kan.
George G. Janke, Milwaukee, Wis.
James B. Lavender, Los Angeles, Calif.
Earl E. Manter, Allentown, Pa.
Michael W. McGuire, Terre Haute, Ind.
William J. Mulroony, Pueblo, Colo.
James L. Orr, Memphis, Tenn.
Sabin L. Ries, Mason City, Iowa.
Rommie C. Vermillion, Indianapolis, Ind.
James A. Whealy, Seattle, Wash.
Charles W. Woods, San Francisco, Calif.

TERMINATIONS

Arthur A. Cuthbertson, Sacramento, Calif.
Bert O. Sherrill, Terre Haute, Ind.

TRANSFERS

Guy F. Abell, from Baton Rouge, La., to Madison, Wis.
Roy Avant, from Knoxville to Nashville, Tenn.
Douglass V. Berglind, from Mexico City, Mex., to Los Angeles, Calif.
Fred E. Castro, from Omaha, Neb., to White Hall, Ill.
Guy W. Eberhardt, from Orangeburg, S. Car., to Knoxville, Tenn.
John J. Evans, Jr., from Augusta, Maine, to Terre Haute, Ind.
Jesse R. Farr, from Ocala, Fla., to Augusta, Maine.
Ross W. Gerding, from Buffalo, N. Y., to Clayton, N. Y.
Oswald H. Graham, from St. Louis, Mo., to Mexico City, Mex.
Eugene E. Hamann, from White Hall, Ill., to Mexico City, Mex.
Willard C. Higby, from Salt Lake City, Utah, to Mexico City, Mex.
Esco W. Hollingsworth, from Evansville, Ind., to Louisville, Ky.
Frank R. Huster, Jr., from St. Louis, Mo., to foreign agricultural service.
William E. Logan, from Harrisburg, Pa., to Fort Worth, Texas.
Howard H. Mishkin, from Chicago, Ill., to New York, N. Y.
Basil E. Robertson, from Columbus, Ga., to Ocala, Fla.
Renato C. Salerno, from Omaha, Neb., to Chicago, Ill.
Edward A. Schilf, from Springfield, Ill., to Trenton, N. J.
Harry S. Smith, from Baltimore, Md., to Harrisburg, Pa.
Lloyd F. Van Gorder, from Baltimore, Md., to Jefferson City, Mo.
Ernest L. Wentz, from Chicago, Ill., to Oklahoma City, Okla.

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Series E Bonds Can Be Held for Another Ten Years.—Series E United States savings bonds can be held for another ten years after maturity, according to the U. S. Treasury Department. Bonds maturing in 1954 need not be cashed and they will continue to draw interest at a rate of 3 per cent compounded semiannually if held for another ten years.

To take advantage of this provision, no action need be taken by the bond holder and he may continue to defer payment of income tax on the interest earned.

AMONG THE STATES AND PROVINCES

Colorado

Floyd Cross Foundation Established.—Dean Floyd Cross of the School of Veterinary Medicine, Colorado A. & M. College, has been signally honored by the Colorado Cattlemen's Association, the Colorado Veterinary Medical Association, and other organizations interested in Colorado's agricultural welfare, by the establishment of a research foundation to be known as the Floyd Cross Foundation.

The Foundation is established on a five-year plan, to be financed on the basis of $50,000 per year for five years, to be subscribed by industries interested in Colorado livestock.

Dr. Cross graduated from Colorado A. & M. College in 1914, joined the staff in 1915, became head of the Department of Pathology and Bacteriology in 1940, and succeeded the late Dr. I. E. Newsom as dean in 1948. He also served as dean of men from 1935 to 1938. The Foundation was established in gratitude for the outstanding work that the school has done on such disease problems as shipping fever, urinary calculi, and liver abscesses. The school has already established a research plan on the college range west of Fort Collins, which is naturally isolated from privately owned livestock herds, an important requirement.

Dr. Floyd Cross

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Staff of Publication Announced.—The *Rocky*

Mountain Veterinarian, published by the Colorado Veterinary Medical Association, announces its staff which includes Drs. R. K. Anderson, editor; N. J. Miller, large animal editor; L. C. Moss, small animal editor; Rue Jensen, pathology editor; and M. N. Riemenschneider, animal disease control editor.

Connecticut

Fairfield County Association.—At the regular annual meeting of the Fairfield County Veterinary Medical Association, held at the Chimney Corner Inn, Stamford, on Dec. 9, 1953, the following officers were elected: Drs. Howard C. Raven, Bridgeport, president; John H. Nickerson, Stamford, president-elect; and William R. Leggett, Westport, secretary-treasurer. The following members were elected to the executive committee: Drs. Howard C. Raven; John H. Nickerson; Russell F. Strasburger, Newtown; William R. Leggett; Walter B. Holcomb, Danbury; Maurice H. Ryan, Stamford; and George H. Alfson, South Norwalk. The committee on Ethics includes Drs. Chester E. Guthrie, Wilton; Edward D. Lubin, Danbury; Donald Krushak, Bridgeport; Wallace F. Vail, Riverside; and Robert A. Rands, Stamford.

s/WILLIAM R. LEGGETT, *Secretary.*

Delaware

State Association.—The annual meeting of the Delaware Veterinary Medical Association was held on Dec. 10, 1953, at the Hotel Rodney in Wilmington.

The guest speakers included **Brig. Gen. J. A. McCallam,** president of the AVMA; **Drs. A. L. Brueckner,** University of Maryland, College Park; **Hadley C. Stephenson,** Veterinary Virus Research Institute, Cornell University, Ithaca, N. Y.; and **Mr. John Clough,** acting secretary of the Delaware State Board of Agriculture.

s/E. F. WALLER, *Resident Secretary.*

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Dr. Teeter Succeeds Dr. McDaniel in State Post.—Dr. Harry McDaniel, Jr. (CVC '13), who served on a part-time basis as director of the Department of Livestock Sanitation since 1938, retired on Jan. 31, 1953. Dr. McDaniel, a member of the AVMA and the Delaware Veterinary Medical Association and president of the Delaware Veterinary Medical Examining Board, plans to continue his private practice in Dover, where he has been a lifelong resident.

The position of director of livestock sanitation, now on a full-time basis, was filled by Dr. William H. Teeter (MSC '34), who has worked with the Bureau of Animal Industry in southern Maryland, conducted a private practice for eight years, and has been with the Maryland Livestock Sanitary Service since 1946. Dr. Teeter is a member of the AVMA, the Maryland State V.M.A., and is a Rotarian.

s/E. F. WALLER, *Resident Secretary.*

Georgia

Short Course on Medical Aspects of Atomic Warfare.—The Medical Service Branch of the Civil Defense Health Services of Georgia, together with Georgia veterinarians, will sponsor a short course on the medical aspects of atomic warfare, to be given in Atlanta. The course will consist of two lectures every other Monday evening from January 18 to April 5.

Illinois

State Association.—The seventy-second annual convention of the Illinois State Veterinary Medical Association was held at the Morrison Hotel in Chicago on Feb. 9-12, 1954.

The following speakers addressed the convention: **Drs. W. A. Aitken,** Chicago, editor-in-chief of AVMA publications; **Murray Banks** (Ph.D.), New York City; **J. W. Bardens,** Lowell, Ind.; **L. E. Boley, H. S. Bryan, H. J. Hardenbrook,** and **R. E. Witter,** College of Veterinary Medicine, University of Illinois, Urbana; **M. E. Boyer,** Freeport; **T. H. Brasmer,** Danville; **C. A. Brandly,** University of Wisconsin, Madison; **J. E. Carver,** Michigan City, Ind.; **G. I. Case,** Kewanee; **C. I. Chappel,** Montreal, Canada; **J. P. Coble,** Springfield; **A. H. Criage,** Pitman-Moore Co., Indianapolis, Ind.; **R. J. Cyrog,** Skokie; **F. E. Eads,** Parke, Davis and Co., Detroit, Mich.; **G. F. Fehrenbacker,** Wyoming, Ill.; **Oscar R. Franzen,** Glenview; **H. H. Gaffin,** Clinton; **W. J. Gay,** Woodstock; **J. M. Gillispie,** River Forest; **Joe W. Green,** state veterinarian, Indianapolis, Ind.; **J. A. Henderson,** Ontario Veterinary College, Guelph; **H. P. Hoskins,** Evanston; **L. W. Hutchings,** Purdue University, Lafayette, Ind.; **K. C. Johnston,** M.D., University of Illinois Medical School; **T. L. Jones,** principal, Ontario Veterinary College, Guelph; **T. A. Kragness,** Chicago; **E. W. Krueger,** Evansville, Wis.; **A. A. Legner,** Sandwich; **C. A. Lemen,** Warrensburg; **R. T. Lidge,** M.D., University of Illinois Medical School, Chicago; **R. E. Linders,** Sparta; **A. G. Madden,** Madeira, Ohio; **H. L. Marsh,** Princeton; **Brig. Gen. J. A. McCallam,** president of the AVMA; **C. L. McGinnis,** Peoria; **A. K. Merriman,** Springfield; **L. Michaud,** Merck and Co., Inc., Rahway, N. J.; **O. Minton,** San Jose; **E. H. Misener,** Chicago; **J. G. Peck,** Chicago; **J. D. Ray,** Affiliated Laboratories Corp., White Hall; **W. H. Riser,** Skokie; **E. C. Saunders,** Elgin; **M. A. Schooley,** Armour Laboratories, Chicago; **O. W. Seher,** Chicago; **R. K. Shideler,** Danville; **A. L. Starkey,** McLean; **Mr. Brewster Stickney,** Council of Profit Sharing Industries, Chicago; **Dr. Frank Thorp, Jr.,** School of Veterinary Medicine, Michigan State College; **Mr. L.**

M. Webb, Lake Shore National Bank, Chicago; **Drs. T. M. Wise,** Effingham; and **C. J. York,** Pitman-Moore Co., Zionsville, Ind.

s/A. G. MISENER, *Secretary.*

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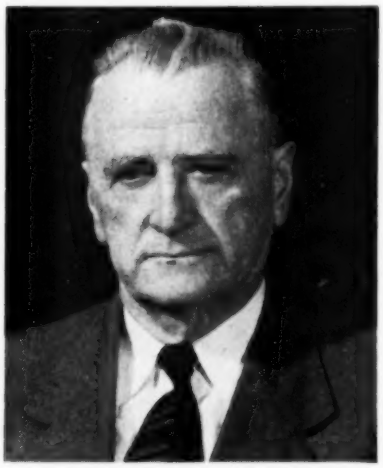
Brucellosis Testing in Cattle.—According to the state veterinary authorities, over 50,000 cattle in 6,000 herds were tested for brucellosis during December, 1953, revealing 1,181 reactors and 3,918 suspects. In 208 swine herds containing 1,966 swine, 204 reactors and 33 suspects were revealed.

Indiana

Dr. L. P. Doyle Twice Honored.—Dr. L. P. Doyle, who was a member of Purdue University staff for several years prior to receiving his D.V.M. degree (MSC '31), was honored for his long, outstanding service to the livestock industry of Indiana, first on Jan. 4, 1954, by the Indiana Swine Breeders Association at its annual dinner in Indianapolis, and again by the Purdue Agricultural Alumni Association on January 7.

On the former occasion the award, a plaque, was presented by Dr. L. M. Hutchings, who described Dr. Doyle as "one of the eminent veterinary scientists of all time."In his early service, Dr. Doyle worked with diseases of poultry but, in recent years, his efforts have been devoted chiefly to diseases of swine.

The JOURNAL adds its congratulations to Dr. Doyle for these well-deserved awards. We believe that few research workers have contributed more to the practical understanding



Dr. L. P. Doyle

of the swine industry's many problems than has Dr. Doyle. Not only has he pioneered in determining the etiology of such diseases as swine dysentery, anemia in baby pigs, atrophic rhinitis, ictero-anemia, and transmissible gastroenteritis, but his clear and understandable reporting on these diseases has made it possible for the practitioners to more readily recognize and deal with these diseases when first encountered in the field. Also, his independent thinking on swine erysipelas, especially the chronic arthritic form, has contributed to a better understanding of this condition. His studies of this rheumatoid type of swine arthritis, which is comparable to a similar condition in man, has interested the medical profession and brought substantial grants to Purdue University from the U. S. Public Health Service, to further research on arthritis in swine. —W.A.A.

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Michiana Association.—The Michiana Veterinary Medical Association and Auxiliary met at the Hotel LaSalle, South Bend, early in January for its regular monthly meeting. There were thirty-nine in attendance.

Dr. Peter Linton, South Bend, gave an outline of the present tuberculosis and brucellosis program in the state. Discussions developed until the meeting came to a regular "bull session" with everyone giving their ideas on the subject.

s/BRUCE HOSTRAWSER, *Secretary.*

Iowa

State Association.—The fifty-second annual meeting of the Iowa State Veterinary Medical Association was held in Des Moines on Jan. 19-21, 1954.

A small animal section was held the second day. The program was unique in that in only one half-day session were more than two major talks listed, allowing considerable time for discussion after each. The major interest centered around the subject of hog cholera vaccination.

Out-of-state speakers included: **Drs. A. H. Quin,** Kansas City, Mo., president-elect of the AVMA; **T. L. Steenerson,** Wilkinson, Ind.; **S. E. Ferguson,** Lake Geneva, Wis.; **L. E. Fisher,** Berwyn, Ill.; **R. J. Beamer,** Cleveland Heights, Ohio; and **W. A. Aitken,** Chicago. The home-state speakers were **Drs. T. F. Thornton,** M.D., Waterloo; **C. W. Brown** and **H. U. Garrett,** Des Moines; **I. A. Merchant, C. D. Lee, W. P. Switzer, W. S. Monlux,** Ames; and **J. W. Carey,** West Liberty.

At least 800 were in attendance at this meeting. Officers elected for 1954 include Drs. J. H. Krichel, Keokuk, president; H. C. Smith, Sioux City president-elect; and F. B. Young, Waukee, reëlected secretary-treasurer.

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Dr. Maestrone Studies in United States.—Dr. Gianpaolo Maestrone of Milan, Italy, recently visited the AVMA office. A 1951 graduate of the School of Veterinary Medicine, Uni-

versity of Milan, he is now an instructor in the hygiene department of that school. Dr. Maestrone is at present a graduate student in veterinary hygiene at Iowa State College, Ames. He expects to return to Milan, Italy in June, 1954.

Kansas

State Association.—The Kansas Veterinary Medical Association held its fiftieth annual convention in the Hotel Broadview, Wichita, on Jan. 17-19, 1954.

The following presented papers at the scientific session: **Drs. W. W. Armistead,** dean, School of Veterinary Medicine, A. & M. College of Texas, College Station; **Victor J. Cabasso,** Sc.D., Lederle Laboratories, Pearl River, N. Y.; **Robert D. Courter,** U. S. Public Health Service, Atlanta, Ga.; **Mack A. Emmerson,** Iowa State College, School of Veterinary Medicine, Ames; **E. J. Frick,** School of Veterinary Medicine, Kansas State College, Manhattan; **W. S. Gochenour,** Pitman-Moore Co., Indianapolis, Ind.; **E. E. Leasure,** School of Veterinary Medicine, Kansas State College, Manhattan; **Deets Pickett,** Kansas City, Mo.; **William F. Riley, Jr.,** School of Veterinary Medicine, Michigan State College, East Lansing; **Clarence Schmidt,** Worthington, Minn.; and **William M. Thies, Jr.,** Hillsboro.

s/K. MAYNARD CURTS, *Secretary.*

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Central District Association.—The Central District of the Kansas Veterinary Medical Association met on Dec. 6, 1953, at the Airport Steak House in Hutchinson, with 82 persons in attendance.

Dr. Ray S. Plyes was nominated as district trustee for 1954 and Dr. Ernest Boley was reëlected secretary-treasurer of the Association. **Dr. Fayne H. Oberst,** of Kansas State College, discussed leptospirosis in cattle and other animals. The following participated in a discussion of brucellosis control regulations: **Drs. K. M. Curts, D. B. Pellette, J. A. Porter, Ben Shambaugh, T. A. Case, J. S. Haley, J. F. Neal, and W. M. Thies.** A resolution was adopted recommending compulsory testing of all breeding female cattle over 6 months of age prior to going through any community sale or public stockyards.

s/ERNEST BOLEY, *Secretary.*

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Northeast District Association.—On Dec. 7, 1953, the Northeast District of the Kansas Veterinary Medical Association met in Lawrence. Dr. J. E. Mosier was nominated as district trustee for 1954, and Dr. W. H. Hay was elected secretary-treasurer.

After a discussion on brucellosis by several in attendance, a resolution was adopted to support the Kansas Brucellosis Control Program. A resolution was also adopted that the Disease Control Committee give thought to accepting registered names and numbers as official identification instead of tattoos or tags.

The approximately 40 veterinarians in attendance then were served a delicious supper by the wives of the hosts, Drs. Wempe and Leasure.

s/W. H. HAY, *Secretary.*

Maine

State Association.—The annual meeting of the Maine Veterinary Medical Association was held Jan. 13, 1954, at Augusta. The following speakers addressed the group: **Drs. Eric W. Simmons,** North Hampton, N. H.; **Granville W. Breed,** Augusta; and **Edward J. Wilson,** Augusta.

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Personals.—Dr. Sidney W. Stiles was named president-elect of the New England Veterinary Medical Association at the meeting held in Newport, R. I., Oct. 17, 1953.

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Dr. Raymond E. Libby was elected president of the New England Livestock Sanitary Association at the meeting held in Boston on Dec. 2, 1953.

Massachusetts

State Association.—The annual meeting of the Massachusetts Veterinary Association was held Jan. 20, 1954, at the Hotel Beaconsfield in Brookline.

The guest speaker was **Dr. Robert L. Leighton,** assistant chief of staff, Rowley Memorial Hospital, Springfield, who discussed the diagnosis and treatment of injuries of the stifle joint in the dog.

s/C. LAWRENCE BLAKELY, *Secretary.*

Michigan

New Staff Members at M.S.C.—New staff members on the veterinary faculty at Michigan State College include Drs. Donald A. Schmidt (MSC '47), AVMA graduate fellow, and recently zoo veterinarian at the Brookfield Zoo near Chicago; Waldo Keller (OSU '53); and D. H. McWade (MSC '50), who has been in general practice at Sheboygan, Mich.

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Personal.—Dr. O. C. Krause of Armada, Mich. is credited with bringing quick help to survivors of an airplane crash recently. When two sabre jet planes crashed in midair, the pilots were able to bail out. Dr. Krause, seeing parachutes descending, called his wife over his two-way car radio and soon the police were at the site of the accident.

Minnesota

State Society.—The fifty-seventh annual meeting of the Minnesota State Veterinary Medical Society was held at the St. Paul Hotel in St. Paul on Jan. 25-27, 1954.

The following speakers comprised the program: **Drs. J. K. Bone,** Chicago; **C. F. Cairy,** Michigan State College, East Lansing; **E. R. Carpenter,** Minnesota Lake; **C. O. Eliason,** Benson; **W. F. Ellgen,** Ivanhoe, **R. B. Helming,** Cresco, Iowa; **J. M. Higbee,** Albert Lea; **H. H. Kanning,** Truman; **E. J. Kerr,** president, Minnesota Poultry Hatchery Association, Minneota; **Brig. Gen. J. A. McCallam,** Washington, D. C., president of the AVMA; **Drs. A. G. Misener,** Chicago; **C. L. Nelson,** Jewell; **S. J. Roberts,** New York State Veterinary College, Ithaca; **J. D. Ray,** Affiliated Laboratories, White Hall, Ill.; **L. H. Schwarte,** Iowa State College, Ames; **R. J. Tobola,** Jackson; **R. L. West,** executive secretary, Minnesota Livestock Sanitary Board, St. Paul; and **C. P. Zepp,** New York City.

The following officers will serve the Society during 1954: Drs. D. H. Spangler, Atwater, president; H. C. H. Kernkamp, St. Paul, president-elect; L. H. Pint, Austin, first vice-president; H. E. Schwermann, New Ulm, second vice-president; and B. S. Pomeroy, secretary treasurer.

s/B. S. POMEROY, *Secretary.*

Missouri

Personal.—Dr. Paul M. Newberne (API '50), Columbus, Ga., has joined the faculty of the School of Veterinary Medicine, University of Missouri.

s/A. H. GROTH, *Dean.*

Nebraska

Dr. Breed Retires from Norden Laboratories.—Dr. Frank Breed (COR '11), secretary and director of Norden Laboratories, has retired after twenty-six years of service.

Dr. Breed is widely known in the veterinary profession, having contributed to veterinary magazines and participated in many programs before state and national groups. He is recognized as an outstanding authority on swine diseases. Among other contributions were his pioneering in the development of symbiotically grown, alum-precipitated bacterins, development of the first licensed double *Clostridium chauvei-septicus* bacterin, and recognition of the first acute outbreak of swine erysipelas in the United States.

Dr. Frank Breed

The temporary address of Dr. and Mrs. Breed is 2825 E. Exeter Drive, Tucson, Ariz.

Nevada

Heavy Livestock Losses to Be Studied.—The new Atomic Energy Commission project will enable the University of Nevada to study the reasons for heavy livestock losses in the area adjoining the atomic energy test site. The nutritive composition of range plants and the possible effect of radioactive fall-out material from the atomic blasts will be studied. Because of the recent drought and disturbed nutrition, authorities doubt that radioactive material is responsible for the recent heavy livestock losses. Dr. John L. O'Hara, of the Nevada State Department of Agriculture, will participate.

New York

Conference for Veterinarians.—The forty-sixth annual conference for veterinarians, sponsored by the New York State Veterinary College, was held Jan. 6-8, 1954, at the College.

The following guest speakers addressed the conference: **Drs. David E. Bartlett,** American Breeders Service, Chicago; **H. M. Doremus,** Towaco, N. J.; **Frank W. Dreisinger,** General Electric Co., Milwaukee, Wis.; **Benedict V. Favata,** M.D., neurological surgeon, Rochester; **Robert W. Fuller,** State Bureau of Animal Industry, Batavia; **L. M. Hutchings,** Purdue University, Lafayette, Ind.; **Brig. Gen. J. A. McCallam,** Washington, D. C., president of the AVMA; **Drs. E. B. D. Neuhauser,** M.D., Children's Medical Center, Boston, Mass.; **D. L. Proctor,** Lexington, Ky.; **H. H. Schwardt,** College of Agriculture, Cornell University, Ithaca; **E. C. Showacre,** M.D., roentgenologist, Cornell University, Ithaca; and **Lt. Col. Bernard F. Trum,** V.C., Atomic Energy Commission, Oak Ridge, Tenn.

Members of the staff of the New York State Veterinary College who participated in the program were **Miss Mary Asdell, Drs. James A. Baker, John T. Bryans, Joseph E. Croshaw, Jr., D. D. Delahanty, H. E. Evans, Julius Fabricant, M. G. Fincher, J. R. Georgi, W. A. Hagan, dean; H. G. Hodges, David E. Hughes, R. W. Kirk, K. M. Lee, E. P. Leonard, K. McEntee, J. O. Mason, Capt. Grayson B. Mitchell, Drs. A. D. Rankin, F. I. Reed, S. J. Roberts, W. F. Stack, H. C. Temple,** and **E. W. Tucker.**

s/W. A. HAGAN, *Dean.*

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New York City Association.—The regular meeting of the Veterinary Medical Association of New York City, Inc., was held on Feb. 3,

1954, at the New York Academy of Sciences. The program speaker was **Dr. L. E. Johnson,** assistant professor, Department of Veterinary Surgery, Ohio State University, Columbus, Ohio. His subject was "Cardiac Resuscitation in the Dog," with illustrations.

Members of the program committee were Drs. R. L. Burkhart, J. R. McCoy, and S. G. Penny.

The officers for 1954 are Drs. Lester H. Barto, Bernardsville, N. H., president; Lawrence W. Goodman, Manhasset, president-elect; and C. E. DeCamp, Scarsdale, secretary-treasurer.

After the meeting, refreshments were served to members of the Association, the Women's Auxiliary, and guests.

s/C. E. DECAMP, *Secretary.*

North Carolina

Conference for Veterinarians.—The sixteenth annual conference for veterinarians, sponsored by the North Carolina State College and the North Carolina State Veterinary Medical Association, was held Jan. 26-29, 1954, at the College.

The following guest speakers addressed the conference: **Drs. Joseph W. Beard,** M.D., Duke University Medical School, Durham; **W. L. Boyd,** dean, School of Veterinary Medicine, University of Minnesota, St. Paul, Minn.; **M. G. Fincher,** New York State Veterinary College, Ithaca; **R. V. Johnston,** Pitman-Moore Co., Indianapolis, Ind.; **Thomas J. Jones,** dean, School of Veterinary Medicine, University of Georgia, Athens; **T. L. Steenerson,** Wilkinson, Ind.; **N. B. Tennille,** School of Veterinary Medicine, Oklahoma A. & M. College, Stillwater; **A. H. Quin,** Kansas City, Mo., president of the AVMA and vice-president of Jensen Salsbery Laboratories; and **J. E. Williams,** U. S. Department of Agricultural Research Service.

The following members from the staff of the North Carolina State College also participated: **Drs. C. W. Barber, T. C. Blalock, L. W. Greene, J. W. Pou,** and **H. J. Rollins,** state veterinarian.

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Short Course on Bovine Fertility.—A short course on bovine fertility and infertility was held at the North Carolina State College, Raleigh, on Dec. 28-30, 1953. Dr. J. Clark Osborne, head of the veterinary department of the College, was in charge of the course.

The three-day program was divided into lectures on basic anatomy, physiology, endocrinology of the bovine reproductive system, and practical demonstration and practice of pregnancy examinations, diseased genitalia examinations, and semen examinations.

The off-campus personnel consisted of **Drs. C. F. Clark,** dean, School of Veterinary Medicine, Michigan State College, East Lansing; **David E. Bartlett,** American Breeders Service, Chicago; **J. A. Duebler, Jr.,** Newtown, Pa.; and **Jack O. Whitaker,** Richmond, Va.

The following staff members also participated: **Drs. W. A. Hornaday, C. B. Randall, W. L. Boyd, Walter Thomas, Richard Myers, T. O. Blalock,** and **J. Clark Osborne.**

s/CLYDE W. YOUNG, *Resident Secretary.*

Ohio

State Association.—The seventieth annual convention of the Ohio State Veterinary Medical Association was held at the Deshler-Hilton Hotel in Columbus on Jan. 6-8, 1954.

The following speakers presented papers at the scientific session: **Drs. J. J. Fishler** and **F. R. Booth,** Elkhart, Ind.; **A. C. Wheeler** and **B. V. Alfredson,** School of Veterinary Medicine, Michigan State College, East Lansing; **J. H. Ripps,** Asbury Park, N. J.; **R. J. Bauer,** Toledo; **C. J. York,** Pitman-Moore Co., Indianapolis, Ind.; **L. F. Ey,** Ohio State University, Columbus; **O. M. Goodloe,** M.D., Columbus Department of Health; **H. E. Goldstein,** Ohio Department of Agriculture, Columbus; **G. R. Anderson,** Ohio State University; **R. L. Farrell,** Ohio State University; **J. H. Drayer,** Columbus Department of Health, Columbus; **M. S. Phillips,** Athens; **R. D. Hoffman,** Bedford, Pa.; **Richard Kellogg,** Central Ohio Breeding Association, Columbus; **W. D. Pounden,** Ohio Agriculture Experiment Station, Wooster; **L. W. Goss,** College of Veterinary Medicine, Ohio State University; **J. C. Trace,** Fort Dodge Laboratories, Fort Dodge, Iowa; **W. R. Krill,** dean, College of Veterinary Medicine, Ohio State University; **A. E. Erickson,** Charlotte, Mich.; **T. E. Powers, Glyde A. Marsh,** and **L. E. Johnson,** Ohio State University; **L. T. Railsback,** Ellsworth, Minn.; **W. S. Konold,** executive secretary of the state Association; **Mr. Russell G. Rongren,** director membership services, AVMA, Chicago; **Bill Zipf,** "Columbus Dispatch"; **William G. Wilcox,** Ohio State University, Bureau of Public Relations; **George Zeis,** WHKC radio station; **Drs. A. G. Madden,** Madeira; **R. L. Knudson,** U. S. BAI; **F. E. Connor,** Morris, Ill.; and **C. K. Shuman,** Springfield.

s/WILLIAM S. KONOLD, *Executive Secretary.*

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Dr. Stanton Youngberg Awarded Honorary Degree.—On Dec. 18, 1953, Dr. Stanton Youngberg (OSU '07) became the first veterinarian to receive an honorary degree from the Ohio State University. On that date, the University conferred the degree of Doctor of Science on Dr. Youngberg in recognition of his distinguished record as a veterinarian and his outstanding services to his country and the University. A partial account of his activities follows.

Born in Lake Park, Minn., in 1887, he received his preliminary education in local schools and then enrolled in veterinary medicine at Ohio State University. After graduation, he received a civil service appointment in the

Dr. Stanton Youngberg

Philippine Islands and began a long career which included service as chief veterinarian of the Islands, Philippine delegate to the Pacific Science Congress in Australia, director of the Philippine Bureau of Agriculture, director of its Bureau of Animal Industry, and other assignments in the agricultural and animal industry activities of the Philippines.

For many years, he was a member and chairman of the Board of Veterinary Medical Examiners and served several terms as president of the Philippine Veterinary Medical Association. He returned to the United States in 1934, but was soon recalled as a consultant on resettlement and economic affairs in the Philippines, work which was halted by the outbreak of war in the Pacific and the invasion of the Islands. Dr. Youngberg and his wife, also a graduate of the University, were interned for over three years, finally being repatriated to the United States in 1945.

One of Dr. Youngberg's most notable accomplishments in the Philippines was his work on rinderpest during which a vaccine was developed and the disease eradicated, a plague which had long handicapped the agricultural and livestock development of the Islands because of its ravages among water buffalo.

Dr. Youngberg is now retired; he and Mrs. Youngberg live near Grove City. He was made a life member of the AVMA in 1951.

Oklahoma

State Association.—The Oklahoma Veterinary Medical Association held its thirty-ninth annual meeting at the Hotel Mayo in Tulsa, Jan. 10-12, 1954, with a near-record attendance. The Sunday program (Jan. 10) was a social hour with square dancing sponsored by the Tulsa Veterinary Medical Association. On Monday morning, a business session was held and the following officers were elected: Drs. R. S. Todd, Tulsa, president; Lewis Moe, Stillwater, vice-president; and C. H. Fauks, Oklahoma City, secretary-treasurer.

Actual telecast photo of Dr. George T. Edds (left) and Dr. Robert P. Knowles (right) being interviewed by Mr. Jack Alexander, announcer for television station KOTV of Tulsa.

The professional program included the following speakers: **Drs. George T. Edds,** Fort Dodge Laboratories, Fort Dodge, Iowa; **Charles L. Davis,** Branch Pathological Laboratory, Denver, Colo.; **C. W. Burch,** University of Wisconsin, Madison; **Robert P. Knowles,** Miami, Fla.; **W. E. Brock** and **C. C. Pearson,** Pawhuska; and **W. F. Irwin,** Tulsa.

A banquet and dance was held Monday night.

Left to right—Dr. C. W. Burch, Mr. Carl Meyerdick, Dr. R. S. Todd, and Dr. Charles L. Davis. Mr. Meyerdick, associate farm director for radio station KVOO, is making a recorded interview for later broadcast.

Dr. W. D. Speer, Tulsa, was program chairman, and Dr. R. S. Todd, chairman of local arrangements. Dr. E. Raymond Walker, Pawhuska, the outgoing president, was largely responsible for the success of the meeting.

s/C. H. FAUKS, *Secretary,*
GLEN A. HARBERT, *Chairman,*
Publicity Committee.

Pennsylvania

Research Center.—The organization of a new Department of Preventive Medicine and Hygiene in the School of Veterinary Medicine of the Universty of Pennsylvania was recently announced by university authorities. The new department has been established primarily for the conduct of research on infectious diseases of animals, and to intensify research into animal diseases communicable to man.

Headquarters from which the department will function will be based on New Bolton Center, the University's 225-acre center in Chester county, near Kennett Square, where a laboratory building which will house the new department is being completed. The new department will work in close coöperation with the Pennsylvania State Department of Agriculture, the Bureau of Animal Industry, and the Pennsylvania State Department of Health.

Dr. Raymond Fagan (COR '39), senior scientist in the Communicable Disease Center of the U. S. Public Health Service in Kansas City, Kan., has been appointed as department chairman. At the University of Pennsylvania, he will have faculty status as associate professor of preventive medicine and hygiene in the veterinary school.

At the Kansas City Communicable Disease Center, Dr. Fagan stressed the epidemiology of animal-borne diseases such as rabies, leptospirosis, brucellosis, psittacosis, and others. He is an associate editor of the JOURNAL, a member of Phi Zeta, the national honorary veterinary medicine fraternity, and of Delta Omega, the national honorary public health fraternity.

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Keystone Association.—The Keystone Veterinary Medical Association met at the University of Pennsylvania, Philadelphia, on Jan. 27, 1954.

The program consisted of clinical demonstrations presented by the staff of the veterinary hospital of the School of Veterinary Medicine.

s/R. C. SNYDER, *Corresponding Secretary.*

Tennessee

State Association.—The Tennessee Veterinary Medical Association held its forty-sixth annual meeting at the Hotel Hermitage in Nashville on Jan. 10-12, 1954.

The following speakers appeared on the professional program: **Drs. Charles T. Caraway,** Nashville; **A. C. Gathmann,** Galva, Ill.; **R. A. Gathmann,** president, Tennessee V.M.A., Franklin; **R. H. Hutcheson,** M.D., Franklin; **R. J. Kirkpatrick,** Galesburg, Ill.; **C. E. Kord,** state veterinarian, Nashville; **Brig. Gen. J. A. McCallam,** Washington, D. C., president of the AVMA; **Wayne H. Riser,** Skokie, Ill.; and **C. B. Tucker,** M.D., Nashville.

The following officers were elected: Drs. H. E. Hill, Maryville, president; H. L. Johns, Huntingdon, president-elect; H. W. Nance, Lawrenceburg, first vice-president; Hugh Lamb, Athens, second vice-president; E. M. Spence, Jackson, third vice-president; and H. W. Hayes, Knoxville, secretary-treasurer.

s/H. W. HAYES, *Secretary.*

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Sectional Societies.—The sectional societies of Tennessee and their officers are:

West Tennessee Veterinary Medical Society—Drs. R. E. Wilhite, Bolivar, president; and John S. Reed, Martin, secretary.

Middle Tennessee Veterinary Medical Society—Drs. S. H. Woods, Sr., Murfreesboro, president; and S. H. Woods, Jr., Murfreesboro, secretary.

East Tennessee Veterinary Medical Society, Drs. S. B. Isbell, Morristown, president; and L. K. Robinson, Oak Ridge, secretary.

s/H. W. HAYES, *Secretary, State Association.*

Texas

State Association.—The Texas Veterinary Medical Association held its annual meeting at the Hotel Galvez in Galveston on Jan. 24-26, 1954.

The following participated in the scientific program: **Drs. W. W. Armistead,** dean, School of Veterinary Medicine, A. & M. College of Texas; **Madero N. Bader,** Houston; **W. C. Banks,** and **A. A. Lenert,** A. & M. College of Texas; **Victor J. Cabasso,** Lederle Laboratories, Pearl River, N. Y.; **H. H. Greenlee,** Fort Worth; **H. J. Hill,** School of Veterinary Medicine, Colorado, A. & M. College, Fort Collins, Colo.; **J. V. Lacroix,** editor, *North American Veterinarian,* Evanston, Ill.; **Mark Morris,** consultant in animal nutrition, Topeka, Kan.; **Edgar J. Poth,** M.D., University of Texas Medical School, Galveston; **Wayne Riser,** Skokie, Ill.; **Varne A. Scott, Sr.,** Stephenville; **A. F. Wempe,** Marysville, Kan.; **J. D. Williams,** president, Texas V.M.A., Colorado City; and **John S. Williams,** University of Houston, Houston.

s/ALVIN A. PRICE, *Executive Secretary.*

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Dr. Evans Honored.—Dr. Edward B. Evans (ISC '18), president of the Texas A. & M. College for Negroes at Prairie View, has again received exceptional honors. For his services to southern agriculture, he was one of two men named "man of the year" by the *Progressive Farmer.* In the 17 annual awards prior to this year, only one other Negro was so honored—Dr. George W. Carver of Tuskegee Institute, in 1942. Dr. Evans, who served as the first dean of the School of Veterinary Medicine at Tuskegee Institute in Alabama, before returning to Prairie View to become president, was awarded the present honor for his inspirational leadership in developing research and extension work in agriculture in Texas.

The announcement states: "Perhaps no president of a land-grant college has excelled him in using its facilities and services to promote the welfare of rural people."

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Death of Dr. Marsteller.—Dr. R. P. Marsteller, dean emeritus of the School of Veterinary Medicine, Texas A. & M. College, passed away after an extended illness on Jan. 1, 1954, at the age of 71. A graduate of Ohio State University in 1905, he had served on the Texas A. & M. faculty for forty-five years before his retirement in 1950.

Dr. R. P. Marsteller

When the Texas Veterinary School was organized in 1916, Dr. Marsteller became professor of medicine and surgery. In 1937, he succeeded Dr. Mark Francis as dean of the school, serving until 1946. He was the author or co-author of several articles on infectious anemia of the horse.

Wisconsin

State Association.—The thirty-eighth annual meeting of the Wisconsin Veterinary Medical Association was held at the Schroeder Hotel in Milwaukee on Feb. 4-6, 1954.

The following presented papers during the scientific sessions: **Drs. A. H. Quin,** Kansas City, Mo., president-elect of the AVMA; **S. K. Andreassen,** Menomonie; **C. A. Brandly** and **David T. Berman,** Department of Veterinary Science, University of Wisconsin, Madison; **J. R. Pickard,** general manager, Livestock Conservation, Inc., Chicago; **H. J. O'Connell,** Department of Agriculture, Madison; **W. R. Winner,** U. S. Department of Agriculture, Madison; **A. S. Rosenwald,** School of Veterinary Medicine, University of California, Berkeley; **Jacques Jenny** and **F. Kral,** School of Veterinary Medicine, University of Pennsylvania, Philadelphia; **L. M. Hutchings,** Department of Veterinary Science, Purdue University, Lafayette, Ind.; **R. C. Klussendorf,** Commercial Solvents Corp., Terre Haute, Ind.; **Q. C. Metzig,** Oshkosh; **A. C. Kelman,** Waterloo; **J. Lillesand,** Verona; **Rolland Anderson,** Elkhorn; **E. V. Morse,** Madison; **F. L. Gentile,** Milwaukee; **Paul T. Candlin,** Madison; **R. E. Hall,** Madison; and **W. D. Stovall,** Madison.

s/B. A. BEACH, *Secretary.*

VETERINARY MILITARY SERVICE

Dr. Hagan Appointed Civilian National Veterinary Consultant.—Dr. William A. Hagan, dean of New York State Veterinary College, Cornell University, Ithaca, N. Y., has been appointed civilian national veterinary consultant to the Surgeon General of the Air Force.

Dr. Hagan served as president of the AVMA during 1947-1948; is the author of several textbooks on veterinary infectious diseases, pathology, and bacteriology; and has made many contributions to professional journals. He is a fellow of the American Association for the Advancement of Science, and has been a consultant to the U. S. Department of Agriculture since 1947.

Dr. Hagan succeeds Dr. Walter R. Krill, dean, School of Veterinary Medicine, Ohio State University, Columbus.

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Lieutenant Colonel Wilder Receives Award.—Lieutenant Colonel Claude O. Wilder, V.C., U. S. Air Force, recently received the Bronze Star medal while on duty in Korea.

The citation read in part "Lieutenant Colonel Claude O. Wilder distinguished himself by meritorious service in prosecution of the Korean conflict during the period 20 August 1952 to 10 June 1953. Colonel Wilder accepted a high degree of responsibility by serving both as command veterinarian and preventive medicine officer for the Fifth Air Force. He made numerous visits to all K-sites in order to inspect matters pertaining to health and sanitation and to assist such personnel concerned to maintain the highest standards possible which increased the combat effectiveness of both flying and nonflying personnel in this command. . . . Colonel Wilder performed his duties in a superior manner which reflected great credit upon himself and the United States Air Force."

Colonel Wilder has returned to the United States and is assigned to Headquarters Flying Training Air Force, Waco, Texas.

BIRTHS

Dr. (MO '52) and Mrs. Lee Cary, Monroe City, Mo., announce the birth of a daughter, JoLynn, on Oct. 1, 1953.

Dr. (WSC '52) and Mrs. Ernest T. Rhode-

fer, Issaquah, Wash., announce the birth of a son, Brian Ernest, on Nov. 19, 1953.

Dr. (KSC '51) and Mrs. R. A. Boyd, Sarcoxie, Mo., announce the birth of a daughter, Valerie Jean, on Nov. 21, 1953.

Dr. (KSC '46) and Mrs. David N. Scarr, West Concord, Minn., announce the birth of a son, Robert Alan, on Nov. 23, 1953.

Dr. (TEX '47) and Mrs. Paul Jungerman, Aurora, Mo., announce the birth of a son, David George, on Nov. 29, 1953.

Dr. (OSU '52) and Mrs. E. P. Barlage, Pandora, Ohio, announce the birth of a son, Steven Edward, on Dec. 5, 1953. Dr. and Mrs. Barlage also have a daughter, Patricia Ann, who is twenty months old.

DEATHS

Wm. Cashmore (nongraduate) 84, Jericho, Vt., died Dec. 13, 1953. Dr. Cashmore started to practice veterinary medicine in 1911. The next year he became a Congregational minister for churches in Jericho and Underhill. He continued both veterinary and pastoral activities for more than thirty years. He was a member of the Vermont Veterinary Medical Association and held various public and fraternal offices.

Andrew B. Cox (CVC '03), 82, Mulvane, Kan., died Oct. 24, 1953. Dr. Cox was a general practitioner.

★**Ray M. Edwards** (CVC '04), 69, Scottsbluff, Neb., died Sept. 29, 1953. Dr. Edwards was a member of the Iowa and Nebraska State Veterinary Medical Associations and of the AVMA.

J. F. Fawcett (CVC '05), 73, Azusa, Calif., died in January, 1953. Dr. Fawcett, a general practitioner, had been a member of the AVMA. He had practiced in Princeton, Ill., until his retirement about seven years ago. Dr. Fawcett is survived by a daughter; his wife survived him by only two months.

★**William F. Hayes** (KCV '12), 70, Farmersville, Texas, died Nov. 12, 1953. Dr. Hayes, who had practiced in Farmersville for forty years, earlier had been active in veterinary affairs in Texas and had served as president of the Texas Veterinary Medical Association. He was also a member of the AVMA.

Oliver H. Leonhart (CVC '00), 79, Oklahoma City, Okla., died Jan. 4, 1954. Dr. Leonhart had retired from the Bureau of Animal Industry in 1937. He had resided in Oklahoma City since 1915.

★**R. P. Marsteller** (OSU '05), 71, Bryan, Texas, died Jan. 1, 1954. Dr. Marsteller was a member of the AVMA. An obituary appears on page 253 of this JOURNAL.

E. D. Merkley (KSC '33), Jaspar, Minn., died Aug. 15, 1953. Dr. Merkley was a general practitioner.

H. A. Michel (MCK '17), 68, Sturgis, S. Dak., died Oct. 26, 1953. Dr. Michel, a general practitioner, is survived by his widow and four brothers.

★**John T. Moran** (CVC '13), 68, Berwick, Maine, died Nov. 19, 1953. Dr. Moran had been in practice for forty years. He was admitted to the AVMA in 1919. His widow survives him.

★**H. C. Moyer** (UP '12), 67, Perkasie, Pa., died Jan. 9, 1953. Dr. Moyer, who was active in civic affairs, was for the past fifteen years a state meat inspector at Bucks County packing houses. He is survived by his widow, a son, and two daughters. Dr. Moyer was a life member of the AVMA.

Frank J. Muecke (IND '01), Indianapolis, Ind., died Nov. 4, 1953. Dr. Muecke had served as meat inspector on the Indianapolis Board of Health.

★**Walter F. Rode** (MCK '13), 74, White Bear, Minn., died Jan. 9, 1954. Dr. Rode was a member of the Minnesota Veterinary Medical Association and of the AVMA.

★**Henry F. Schmille** (STJ '19), 55, Kansas City, Mo., died Nov. 29, 1953, of a heart attack. Early in his career, Dr. Schmille practiced in Westboro, Mo.; in recent years, he operated a small animal hospital in Kansas City. He was a member of the Missouri Veterinary Medical Association and of the AVMA.

Charles B. Shaw (OVC '98), 85, Leominster, Mass., died Dec. 26, 1953. Dr. Shaw had practiced for fifty-five years in Leominster. He was for several years a member of the AVMA.

★**Lawrence J. Steuber** (MCK '14), 76, Prairie du Sac, Wis., died Nov. 11, 1953. Dr. Steuber had practiced in Prairie du Sac since his graduation and was a past-president of the Wisconsin Veterinary Medical Association. He had served as a deputy sheriff and bailiff for many years and was active in civic affairs. He was a member of the AVMA.

Frank C. Sundstrom (KCV '18), 65, Shelton, Neb., died Sept. 18, 1953. Dr. Sundstrom had been a member of the AVMA.

Thomas B. Tipton (KCV '13), 65, Hume, Mo., died on Dec. 23, 1953. Dr. Tipton had practiced at Hume for more than thirty years. He was a member of the Missouri Veterinary Medical Association.

★**Guy N. Welch** (OVC '03), 70, Northfield, Vt., died Dec. 16, 1953. Dr. Welch had practiced in Northfield for fifty years. He had been an officer in many civic and fraternal capacities and had served as president of the New England and Vermont Veterinary Medical Associations. For many years he was secretary of the latter Association. Dr. Welch was admitted to the AVMA in 1912 and resigned in 1951.

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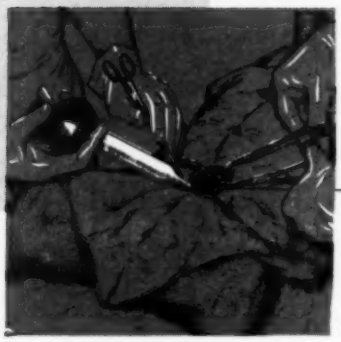
Death Reported in Error.—The report of the death of Dr. Thomas B. Lindsay (October, 1953, JOURNAL, p. 373), reported to us by the post office, is in error. While we regret the error, we are happy that the information was not true.

★Indicates members of the AVMA.



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PROFESSIONAL LITERATURE AVAILABLE ON REQUEST

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COMING MEETINGS

Notices of Coming Meetings must be received by 4th of month preceding date of issue

Alabama Veterinary Medical Association. Annual meeting. Admiral Semmes Hotel, Mobile, Ala., April 4-6, 1954. M. K. Heath, Auburn, Ala., secretary.

Animal Disease Research Workers in the Southern States. Annual meeting. Alabama Polytechnic Institute, Auburn, Ala., April 8-9, 1954. Paul L. Piercy, School of Veterinary Medicine, University of Georgia, Athens, Ga., secretary.

Washington, State College of. Annual conference for veterinarians. College of Veterinary Medicine, State College of Washington, Pullman, Wash., April 8-10, 1954. John R. Gorham, Department of Veterinary Pathology.

Conference on Diseases in Natural Transmission from Animal to Man. Memorial Student Center, College Station, Texas, April 12-13, 1954. Dr. J. P. Delaplane, Texas A. & M. College, College Station, Texas, in charge of arrangements.

Texas Conference on Diseases in Nature Transmissible to Man. Annual conference. A. & M. College of Texas, College Station, Texas, April 12-13, 1954. John P. Delaplane, A. & M. College of Texas, College Station, Texas.

Pennsylvania, University of. Annual postgraduate short course for veterinarians. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., April 12-15, 1954. M. W. Allam, dean.

North Central Iowa Veterinary Medical Association. Annual meeting. Warden Hotel, Fort Dodge, Iowa, April 15, 1954, from 10:00 a.m. to 5:00 p.m. B. J. Gray, Box 797, Fort Dodge, Iowa, secretary.

Oklahoma Conference for Veterinarians. School of Veterinary Medicine, Stillwater, Okla., May 3-4, 1954. W. M. Rice, Department of Medicine and Surgery, chairman.

American Animal Hospital Association. Annual meeting. Hotel Statler, New York, N. Y., May 5-8, 1954. Wayne H. Riser, 5335 Touhy Ave., Skokie, Ill., secretary.

Eastern Iowa Veterinary Association, Inc. All-day practitioners' clinic. Hawkeye Downs, Cedar Rapids, Iowa, May 11, 1954. Wayne H. Thompson, Earlville, Iowa, secretary.

Texas Conference for Veterinarians. Annual conference. School of Veterinary Medicine, A. & M. College of Texas, College Station, Texas, June 3-4, 1954. R. D. Turk, chairman.

Wyoming Veterinary Medical Association. Annual meeting. Cody, Wyo., June 13-14, 1954. John F. Ryff, P.O. Box 960, Laramie, Wyo., secretary.

Montana Veterinary Medical Association. Annual meeting. Miles City, Mont., June 16-18, 1954. E. A. Tunnicliff, Agricultural Experiment Station, Bozeman, Mont., secretary.

Idaho Veterinary Medical Association. Annual meeting. Twin Falls, Idaho, June 21-22, 1954. A. P. Schneider, 2025 N. 23rd St., Boise, Idaho, secretary.

Maritime Veterinary Associations Joint Conference. Annual meeting. Mount Allison University, Sackville, N. B., June 22-24, 1954. Dr. J. F. Frank, Sackville, N. B., secretary, joint committee.

Utah Veterinary Medical Association. Annual meeting. Ogden, Utah, June 24-25, 1954. Joe B. Thurman, 1407 S. State St., Orem, Utah, secretary.

American Veterinary Medical Association. Annual meeting. The Olympic Hotel, Seattle, Wash., Aug. 23-26, 1954. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

New York State Veterinary Medical Society. Annual meeting. Saranac Inn, Saranac, N. Y., Sept. 15-17, 1954. Joan S. Halat, Utica, N. Y., acting executive secretary.

Conference for Veterinarians. Alabama Polytechnic Institute, Auburn, Ala., Sept. 16-18, 1954. R. S. Sugg, dean, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala.

Pennsylvania State Veterinary Medical Association. Annual meeting. Pocono Manor Inn, Pocono Manor, Pa., Oct. 13-15, 1954. R. C. Snyder, Walnut St. and Copley Rd., Upper Darby, Pa., secretary.

Foreign Meetings

Second Pan American Congress of Veterinary Medicine. Sao Paulo, Brazil, April 3-10, 1954. Dr. Joao Soares Veiga, chairman; Dr. Virginia Buff D'Apice, secretary general, P.O. Box 7064, Sao Paulo, Brazil.

British Caribbean Veterinary Association. Port-of-Spain, Trinidad, B.W.I., May 24-27, 1954. Dr. Stephen B. Bennett, c/o Department of Agriculture, St. Clair, Port-of-Spain, Trinidad, chairman, Organizing Committee.

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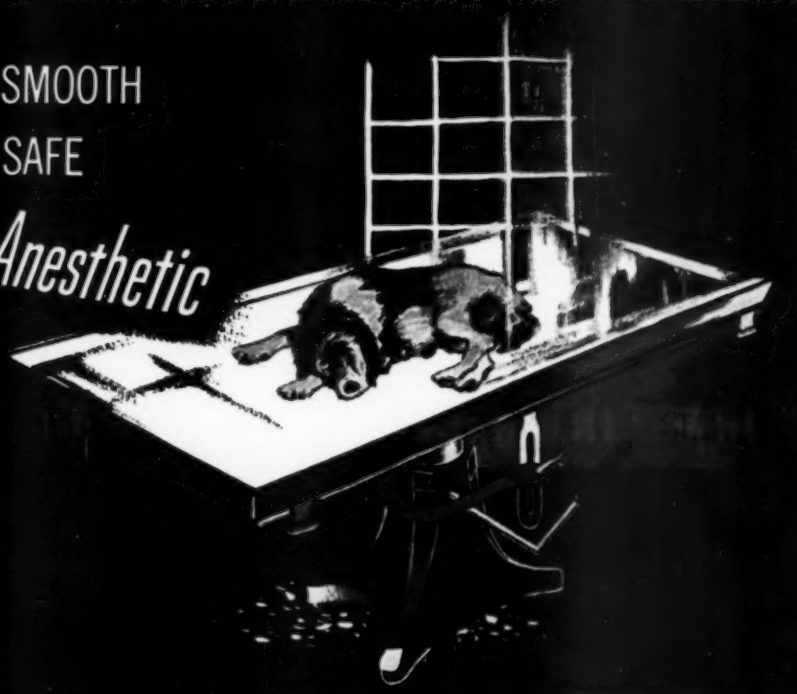

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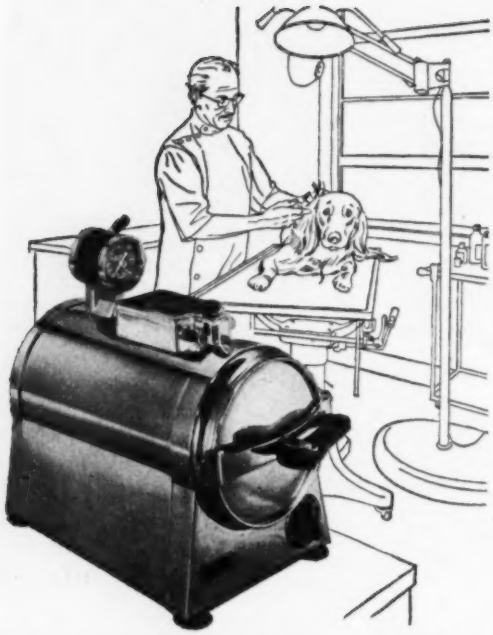

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(COMING MEETINGS—*continued from p. 30*)

Regularly Scheduled Meetings

Bay Counties Veterinary Medical Association, the second Tuesday of each month. David E. Madsen, 44 South 4th St., San Jose, Calif., secretary.

Cedar Valley Veterinary Association, the second Monday of each month (except July and August) at Black's Tea Room, Waterloo. F. E. Brutsman, Traer, Iowa, secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. W. E. Smith, 516 Oatman, Sanger, Calif., secretary.

Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel in Greensboro. Mr. Earl D. Adams, Greensboro, N. Car., secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month. Robert C. Glover, 1021 Davis St., Evanston, Ill., secretary.

Coastal Bend Veterinary Association (Texas), the second Wednesday of each month. J. E. Hoban, 4301 S. Port Ave., Corpus Christi, Texas, secretary.

Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa. J. R. Rosdail, Pomeroy, Iowa, secretary.

Cuyahoga County (Cleveland, Ohio) Veterinary Medical Association, the first Wednesday of each month—September through May (except January)—at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Roger W. Grundish, 4217 Mayfield Road, South Euclid 21, Ohio, secretary.

East Bay Veterinary Medical Association, bimonthly, the fourth Wednesday. Robert Clemens, 23352 Orchard, Hayward, Calif., secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly. C. B. Randall, Kinston, N. Car., secretary.

Fayette County Veterinary Association, Iowa, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Florida, North-East Florida Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. J. O. Whiddon, 829 San Marco Blvd., Jacksonville, Fla.

Greater St. Louis Veterinary Medical Association, the first Friday of the month at the York Hotel, Sixth and Market Streets.

(*Continued on p. 34*)

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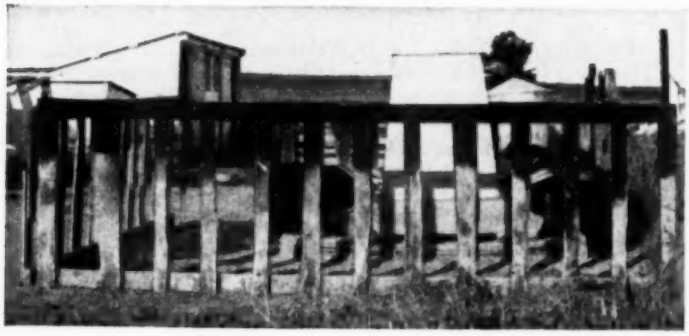

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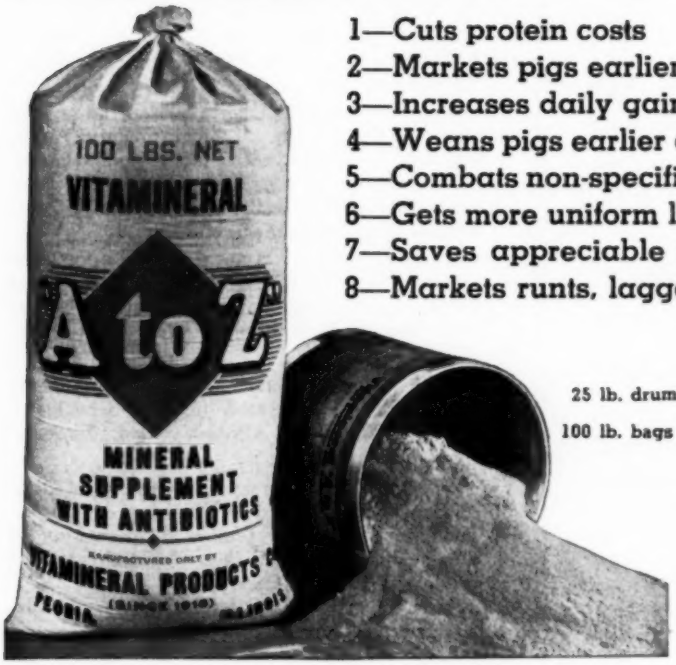

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(COMING MEETINGS—*continued from p. 32*)

Luther E. Fredrickson, Room 11, Municipal Courts Bldg., St. Louis, Mo., secretary.

Houston Veterinary Medical Association, Houston, Texas, the first Thursday of each month. Edward Lepon, Houston, Texas, secretary-treasurer.

Illinois Valley Veterinary Medical Association, the second Sunday evening of even-numbered months at the Jefferson Hotel, Peoria, Ill. S. M. McCully, Lacon, Ill., secretary.

Indiana Tenth District Veterinary Medical Association, third Thursday of each month. L. A. Snider, New Palestine, Ind., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month, in Louisville or within a radius of 50 miles. E. M. Lang, 716 E. Broadway, Louisville, Ky., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at the Hotel Continental. J. A. Zacher, 3632 Main St., Kansas City, Mo., secretary.

Kansas City Veterinary Medical Association, the third Tuesday of each month, in the Hotel Continental, 11th and Baltimore, Kansas City, Mo. J. C. Davis, 7332 Canterbury St., Kansas City 13, Mo., secretary.

Kern County Veterinary Medical Association, the first Thursday of each month. Richard A. Stiern, 17 Niles St., Bakersfield, Calif., secretary.

Keystone Veterinary Medical Association, the Philadelphia County Medical Society Building, 301 S. 21st Street, Philadelphia, Pa., on the fourth Wednesday of each month. Raymond C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

Kyowva Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Karl Mayer, 1531 Fourth Ave., Huntington, W. Va., secretary.

Maricopa County Veterinary Association, the second Tuesday of each month. Charles J. Prchal, 1722 East Almeria Road, Phoenix, Ariz., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from September through May, at the Academy of Medicine of Northern New Jersey, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Millburn Ave., Maplewood, N. J., secretary.

Michiana Veterinary Medical Association, the second Thursday of each month, at Hotel LaSalle, South Bend, Ind. Bruce Hostrawser, 2621 Mishawaka Ave., South Bend, Ind., secretary.

(*Continued on p. 36*)

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(COMING MEETINGS—*continued from p. 34*)

Michigan, Southeastern Veterinary Medical Society. Herman Kiefer Hospital, Detroit, Mich., the second Wednesday of each month from October through May.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. George McCollister, 2146 Broad St., San Luis Obispo, Calif., secretary.

Milwaukee Veterinary Medical Association. Wisconsin Humane Society, 4150 N. Humbolt Ave., Milwaukee, Wis., the third Tuesday of each month. Kenneth G. Nicholson, 2161 N. Farwell Ave., Milwaukee, Wis., secretary.

Mobile-Baldwin Veterinary Medical Association, the first Tuesday of each month at the Hotel Admiral Simmes, Mobile, Ala. C. Eric Kennedy, Mobile, Ala., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 66 Marion Ave., Salinas, Calif., secretary.

New Castle County Veterinary Society, the second Wednesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. Harold Roberts, Paper Mill Road, Newark R3, Del., secretary.

New York City, Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63 St., New York City. C. R. Schroeder, Lederle Laboratories, Inc., Pearl River, N. Y., secretary.

Northern Colorado Veterinary Medical Association, the second Monday of each month. William D. Carlson, P.O. Box 478, Fort Collins, Colo., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday evening from September through June, at the Casa Mana Restaurant, Cedar Lane, Teaneck, N. J. Robert R. Shomer, 1680 Teaneck Road, N. J., secretary.

Northern San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. Tom Hagan, Gen. Del., Escalon, Calif., secretary.

Oklahoma County Veterinary Medical Association, the second Wednesday of every month except August and July. R. J. Keller, 1701 N. Highland Drive, Oklahoma City, Okla., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month at 7:00 p.m. in the Antlers Hotel, San Bernardino, Calif. William J. Kelber, 1111 West A St., Ontario, Calif., secretary.

Orange County Veterinary Medical Association, bi-monthly. Donald E. Lind, 2643 N. Main, Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the

(*Continued on p. 38*)

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(COMING MEETINGS—*continued from p. 36*)

third Monday of each month. P. H. Hand, Box 1035, Millbrae, Calif., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month at 7:00 p.m. in Mull's Motel in Hickory, N. Car. G. V. McCranie, Hickory, N. Car., secretary.

Pima County (Arizona) Veterinary Medical Association, the third Wednesday of each month, in Tucson. R. W. Adami, 2103 S. 6th Ave., Tucson, Ariz., resident secretary.

Portland (Oregon) Veterinary Medical Association, the second Tuesday of each month, in the Auditorium of the Upjohn Company. Victor T. Oliver, 9705 S.W. Barbur Blvd., Portland 19, Ore., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. H. M. Strandberg, 203 D St., Petaluma, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. S. M. Foster, 430 College, Woodland, Calif., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. F. Ferguson, 1702 S. Dort Highway, Flint, Mich., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. Warren J. Dedrick, 904 S. Lemon, El Cajon, Calif., secretary.

Santa Barbara-Ventura Counties Veterinary Medical Association, Friday evenings every sixth week. Dee Wodars McDermott, 5879 Hollister, Coleta, Calif., secretary.

Seattle Veterinary Medical Association, the third Monday of each month in the home of Dr. Fred Cummings, 5828-5th, N.W., Seattle, Wash.

Southern California Veterinary Medical Association, the third Wednesday of each month. R. W. Sprowl, 11756 San Vicente Blvd., Los Angeles 49, Calif., secretary.

South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. A. Majilton, 1093 N. E. 79th St., Miami, Fla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month, in Director's Parlor of the Brookside State Bank, Tulsa, Okla. John Carnes, Muskogee, Okla., secretary.

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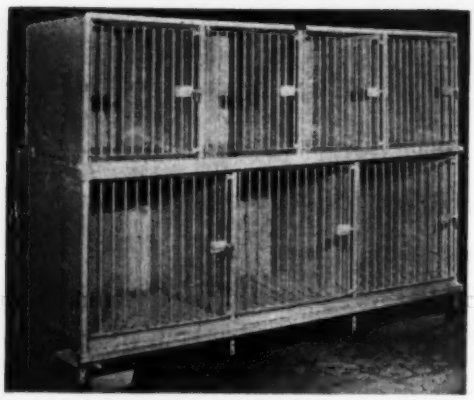

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(*Continued on p. 42*)

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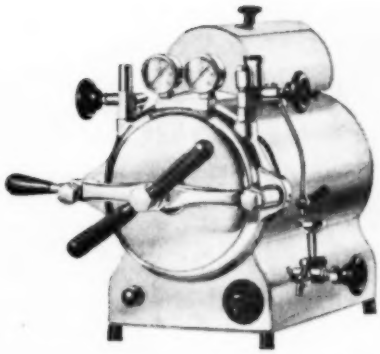

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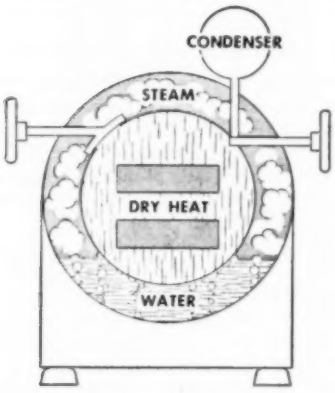

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5% discount is now allowed on all orders of 1000 or more—including mixed orders of MASTICS and MASTICS P&S (500 each).

MASTICS *save up to 49c per treatment*—a saving all farmers appreciate. Keep a large stock on hand to supply all your farmers' needs—MASTICS are available only through veterinarians (no drug or feed store competition for you)—and with the prices quoted above it's worth your while to be known as the source of supply.

The Martin Laboratories

MASTICS

Dept. R WEST CHESTER, PENNA.

Please send me a trial supply at the new low prices—

MASTICS	MASTICS P&S
____ 25 . . . $ 3.50	____ 25 . . . $ 4.00
____100 . . . 13.00	____100 . . . 15.00

*NAME*_____

*ADDRESS*_____

*CITY*_____ *STATE*_____

(CLASSIFIED ADS—*continued from p. 40*)

Illinois license. State age, experience, marital status, desired salary in reply. Address "Box V 17," c/o JOURNAL of the AVMA.

Veterinarian wanted; good salary to start. Chance to lease or purchase after six months. Address "Box V 15," c/o JOURNAL of the AVMA.

Remittance must accompany advertisement

Veterinarian wanted for well-established small animal hospital in Detroit. Must have experience in small animal hospital. Good salary commensurate with experience. Address "Box V 18," c/o JOURNAL of the AVMA.

(*Continued on p. 44*)

Dog Population Now 22,500,000

America's dog population continues to grow, though not at the spectacular rate of the 1940-1950 decade, the Gaines Dog Research Center reports. A survey just completed by the Center indicates that the current dog population stands at 22,500,000. This compares with the estimated dog population of 20,000,000 in 1947.

The data were obtained by mail from a representative cross section of the nation's families — the method used in the 1947 survey.

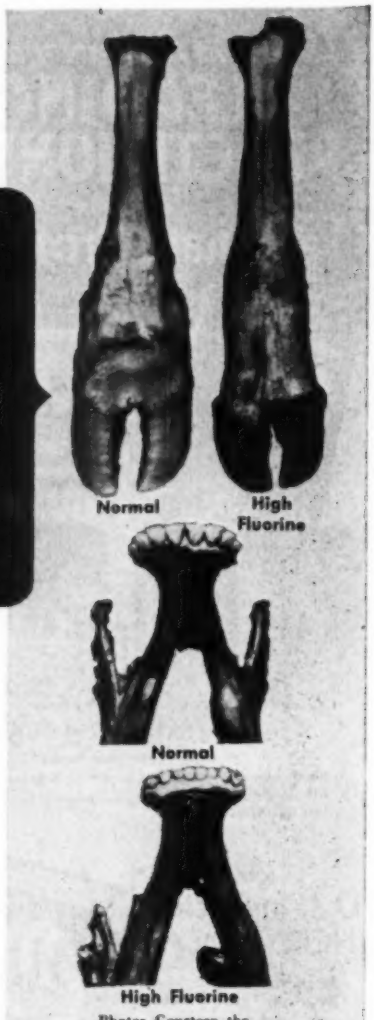
Other interesting facts brought out by the survey are: 40 per cent of America's homes have one or more dogs; the South continues to lead in the number of dog-owning families, as well as in the average number of dogs per family; more families with children own dogs than families without children; families in the lowest income bracket own dogs in slightly above average proportions.

Mr. Sykes Appointed to 4-H Club Foundation Council

Mr. J. D. Sykes, vice-president of Ralston Purina Company, St. Louis, and chairman of the Board of directors of the American Feed Manufacturers' Association, has been appointed to the Builders' Council of the National 4-H Club Foundation. The Council is comprised of nationally known business and industrial leaders who voluntarily give their time in support of the Foundation. Mr. Sykes is considered an invaluable addition to the Council.

The National 4-H Club Foundation, an educational, nonprofit, and nongovernmental organization, was established in 1948. Its program includes five projects: (1) the National 4-H Club (training) Center located near Washington, D.C.; (2) International Farm Youth Exchange of American and foreign students; (3) Research Project on the Development of Youth to assist them in becoming mature, well-adjusted citizens in their communities; (4) training in human relations for 4-H Club leaders; and (5) a nation-wide program of 4-H training in citizenship and character building.

The FACTS about the FLUORINE HAZARD



Photos Courtesy the Utah Agr. Exp. Sta.

In 1951 and 1952 a total of 320,000 tons* of raw, unpurified phosphates were used in livestock and poultry rations. Such phosphates, known to have P:F ratios as low as 7:1, fall far short of the 100:1 minimum safe P:F ratio set by American Feed Control Officials for defluorinated feed-grade phosphates.

Continued use of these raw, high-fluorine ingredients to meet today's high phosphorus requirements tends to increase the incidence of fluorosis. As a result, farmers risk the loss of meat, milk and egg production. This is particularly true in the early stages or mild cases. In such instances farmers may fail to seek prompt diagnosis and wrongly attribute production slow-downs to other causes.

To help solve this problem at the ingredient level, International Minerals has developed 20/FOS — an all-purpose, feed-grade phosphate that is *safe for all formula feeds and mineral mixes.* New 20/FOS, with a 160:1 P:F ratio, gives an *extra* margin of safety even in high-fluorine areas. It is high in phosphorus . . . promotes more efficient digestion and assimilation . . . helps keep livestock healthy and on feed.

* Source, U.S.D.A.

Enlarged, stiff, painful joints; soft worn teeth; unthrifty animals: these are common symptoms of fluorosis readily recognized by the veterinarian. Today, 20/FOS helps combat the incidence of fluorosis by supplying a phosphatic supplement that is unusually low in fluorine and completely safe for all livestock and poultry feeds.

International Minerals Chemicals

® 20/FOS

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

the Nation's Largest Producer of Phosphates • General Offices: 20 North Wacker Drive, Chicago 6

Used and Recommended by
LEADING PRACTITIONERS *in the* **Veterinary Profession**

Prescription DIETS

DISPENSED BY VETERINARIANS ONLY

5 SPECIAL FORMULAE

All Useful in nutritional therapy

i/d-for Intestinal Disorders
k/d-for Nephritic Conditions
r/d-for Obesity Correction
p/d-for Reproduction & Lactation
c/d-Special Diet for Cats

U.S. Inspected HORSE MEAT

A natural food for dogs and cats. Feed raw, cooked, or blend with cereal or dry foods.

Seal of Approval DOG FOOD

For General Hospital Feeding

Hill's Dog Food was tested commercially to satisfy your food committee's standards, before being granted the 'Seal of Approval'

(Inquiry form for graduate veterinarians only)
HILL PACKING COMPANY
Prescription Ration Dept. AV
P. O. Box 148, Topeka, Kan.
Please send me complete information on therapeutic feeding of dogs and cats.

NAME .....

ADDRESS .....

(CLASSIFIED ADS—*continued from p. 42*)

Wanted—Positions

Kansas State senior, married, desires to work in mixed practice in Minnesota upon graduation in May. In favor of position which could lead to purchase. Address "Box V 7," c/o JOURNAL of the AVMA.

Position wanted in small animal or general practice; prefer eventual partnership or purchase. Licensed in New York and Maryland. Graduated 1953, one year of experience, small animals. Married, vetern. Address "Box V 11," c/o JOURNAL of the AVMA.

BAI veterinarian retiring April 30 wants position as field contact man in West Coast area for company producing either biologicals, antibiotics, animal foods, or instruments. Address "Box T 24," c/o JOURNAL of the AVMA.

(*Continued on p. 46*)

Dr. Regenos with Pitman-Moore Thirty-Five Years

Dr. S. H. Regenos has completed thirty-five years with the Pitman-Moore Company, Indianapolis. Joining the company in January, 1919, after receiving his D.V.M. from Ohio State University in 1913, he has devoted full time to the diagnostic laboratories. Dr. Regenos has been a member of the AVMA since 1913 and of the Indiana State V.M.A. since 1919.

Kennel Cage Units

of Wire Mesh and Metal

IN TWO TIERS: 4, 6, and 8 cage units
IN THREE TIERS: 6, 9, and 12 cage units
Sanitary, durable, and easily maintained; galvanized materials; removable pans; hand woven wire mesh doors, maximum light and ventilation; sized for dogs and cats; removable partitions; shipped crated; easily assembled.

THE EIGHT CAGE UNIT

manufacturers

EAST RIVER WIRE WORKS

39-40 Twenty-first St., Long Is. City 1, N.Y.

FROM SWAB TO MOP

Bactine®

BRAND

GERMICIDE
FUNGICIDE
DEODORIZER

SUPERIOR SAFETY

- ... will not cause inflammation of the gastrointestinal tract due to licking
- ... does not contain iodine, mercury or phenol
- ... relieves itching, discourages scratching
- ... can safely be recommended for home or farm use
- ... pleasant to apply, does not sting or dry skin on hands
- ... sanitizes and deodorizes

EXTRA EFFICACY

- ... residual antibacterial and antifungal action lasts for hours on hands, skin, equipment and glass, metal, tile, plastic and enamel surfaces
- ... penetrates deeply into pores, cracks, abrasions
- ... has fresh, clean odor
- ... destroys odors, does not mask them
- ... does not stain—is not greasy

topical germicide
cuts—burns—abrasions
fungus infections
obstetrical preparation
wet dressings
skin irritations
operative antisepsis
preparation for injections
hand disinfection
instrument disinfection
disinfecting, deodorizing cages
disinfection of thermometers
disinfection of syringes

Bactine: Available in 1-gallon, 1-pint and 6-ounce bottles through your regular supplier or we will assist you in ordering.

MILES LABORATORIES, INC · ELKHART, INDIANA

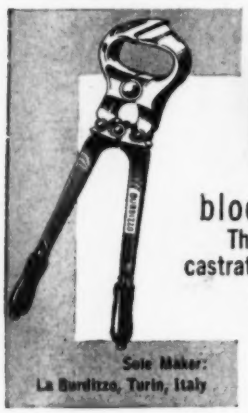
7153

Veterinarian desires association leading to partnership or purchase of small animal or mixed practice in Connecticut or New York. Small and large animal experience. Graduate of AVMA-approved school. Married. Address "Box V 14," c/o JOURNAL of the AVMA.

Opportunity wanted—mainly small animal practice. One year of small animal experience; Florida license. Graduate of AVMA-approved school. Address "Box V 19," c/o JOURNAL of the AVMA.

Relief work—Experienced, graduate veterinarian available for relief work while you are on vacation. Licensed. Address "Box S 10," c/o JOURNAL of the AVMA.

Experienced senior, AVMA-approved school, desires position with busy practitioner, or possible practice lease in or around Detroit, Michigan, May 31. Desire immediate arrangement. Excellent clientele relationships. Address "Box V 24," c/o JOURNAL of the AVMA.



burdizzo
T. M. Reg.
bloodless castrator
The "Burdizzo" eliminates castration losses . . . no shrink . . no infections . . . no screwworm risks! Order from **Jensen-Salsbery Laboratories, Inc.**
Kansas City 10, Missouri
Sole Maker:
La Burdizzo, Turin, Italy

Wanted—Practices

Veterinarian, 31, married; recognized school, horse and small animal experience. Prefer Southwest. Interested in practice to purchase, lease, group practice, or partnership. What have you? To be released from Army Remount Duty, April 1. Address Capt. Kenneth Carlson, Fort Reno, Okla.

Opportunity wanted to become associated in mixed practice. Desire long term lease, chance to buy into, or partnership with a reliable veterinarian. Licensed in California, Oregon, Washington; recent graduate, family. Reason for moving, ambition and initiative. Address "Box T 8," c/o JOURNAL of the AVMA.

Purchase, lease, or partnership of veterinary practice wanted in the Pacific Northwest. Address "Box V 9," c/o JOURNAL of the AVMA.

Want to buy or lease small animal hospital in New York State. Please give annual gross and selling price in first letter. Address "Box V 21," c/o JOURNAL of the AVMA.

(*Continued on p. 48*)

IDEAL for the busy VETERINARIAN . . .

THE NEW EVSCO THREE-HEAT Hair Dryer

LOW PRICED at $26.50

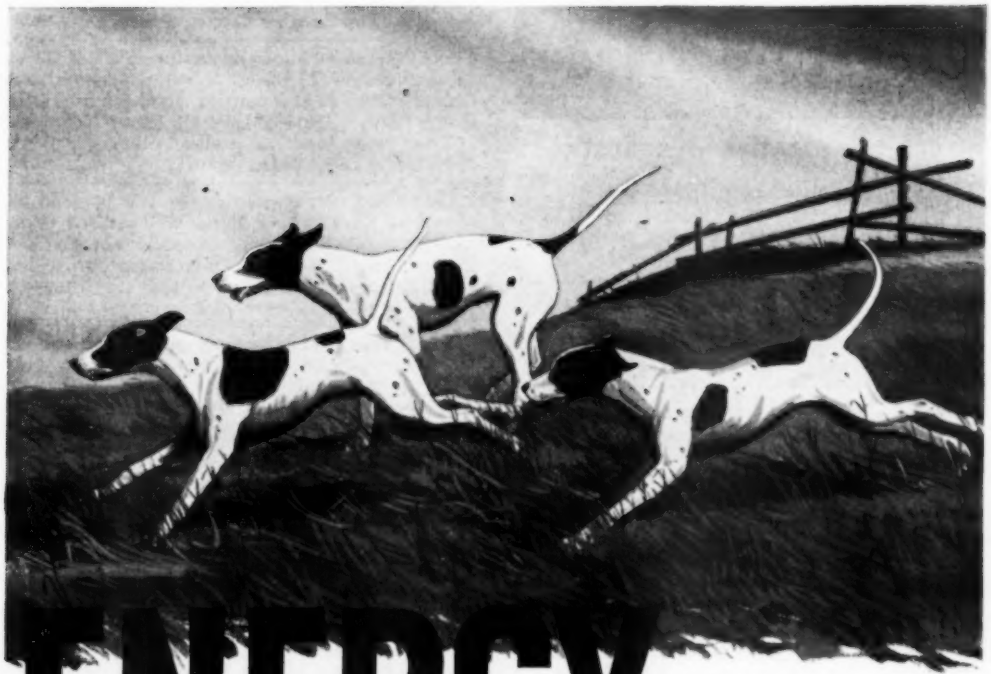
DESIGN FOR DRYING

- **Lightweight—8½ lbs; hangs on any standard dog cage.**
- **Temperature (12" from nozzle) "Lo" heat 103°F. "Hi" heat 134°F.**
- **Low heat, high heat, and cool air flows.**
- **Rubber-cushioned attachments absorb vibrations.**
- **Touch-of-finger operating mechanism.**
- **Beautiful baked enamel finish with chrome trimming.**

110/120 volts.
7 ft. U.L. approved cord.
50/60 cycle AC current only.

HERE IS THE OPPORTUNITY TO OWN MORE THAN ONE DRYER.

ETHICAL VETERINARY SUPPLY CO.
34-28 31st STREET, LONG ISLAND CITY 6, N. Y.



ENERGY...Tests show

KASCO'S MORE FULLY USABLE

Scientific tests, comparing Kasco Dog Food with three other leading brands, proved this to be true:

Kasco 13% more energy value than Brand A.
Kasco 8% more energy value than Brand B.
Kasco 6% more energy value than Brand C.

In EVERY test Kasco Dog Food was more completely converted into usable energy . . . less food was wasted.

To you this means lower costs . . . better feed efficiency . . . less work . . . better results for every dollar spent . . . because, with Kasco's higher energy value, it takes less food per day.

High energy in a dog food is NOT obtained from just one or two ingredients. It is the right amount of many, carefully blended ingredients that makes Kasco a superior dog food.

KASCO'S HIGH ENERGY MEANS LOWER FEED COSTS... AND TOP NOTCH RESULTS!

KASCO DOG RATION

KASCO MILLS, Inc. • Toledo, Ohio • Waverly, New York

Sold only to Graduate Veterinarians

FUNGASARC

for the effective treatment of skin conditions

Destroys fungi; sarcoptes scabei canis; demodex canis; mites; fleas; lice. Repels ticks. Non Staining; not greasy; has no objectionable odor, destroys odors of external origin. Non Toxic; may be used daily in recommended dilution. Concentrated; one gallon makes four.

Gallon	Quart
$13.95	$4.00
Makes 4 gallons	Makes a gallon

Available nationally through well known Distributors

Osco Chemical Company, Inc.

P.O. Box 2157, Atlanta 1, Georgia

(CLASSIFIED ADS—*continued from p. 46*)

For Sale or Lease—Practices

Hospital and 7-room home for sale on 30 acres on main highway; town, 25,000 population, North Central state. Mixed practice, good farming section, mostly dairy. Sale price real estate value only, $10,000 will handle. Address "Box V 1," c/o JOURNAL of the AVMA.

Established mixed practice for sale in good dairy section of western New York. Will sell for value of real estate plus inventory of equipment and drugs wanted. Excellent terms. Only reason for selling—health factor. Address "Box V 13," c/o JOURNAL of the AVMA.

Remittance must accompany advertisement

One of the nicest small animal hospitals and practices in Colorado for sale. Total price, $33.-500; $9.600 down payment. Includes x-ray, drugs.

(*Continued on p. 52*)

WHITE'S ANIMAL CASTRATION

A new textbook for TEACHERS, STUDENTS and PRACTITIONERS.

Price $7.50

For sale by book dealers, also by the Author, George Ransom White, M.D., D.V.M., P. O. Lock Box 901, Nashville, Tennessee.

versatile . . .

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medium size

SERVALL

Angle Centrifuges

Research Scientists and Technicians everywhere acclaim the Medium Size SERVALL Angle Centrifuges: Type M, Type SP and Type SP/X. All employ the same motor (which is equipped with an exclusive self-centering device and dynamical balance) and all are adaptable to various tube sizes by means of simple, convenient adapters.

Type M, SP and SP/X Servall Angle Centrifuges have a rim dia. of 10 in., speed of 5000 r.p.m. and hold tubes at a 40° angle.

Type M holds 27 round bottom tubes of maximum 15cc and is widely used in hospital routine work. Has 27 metal holders.

Type SP, frequently specified for routine or research work, holds six 75cc plain or 70cc constricted neck tubes. (Special unbreakable cellulose nitrate tubes of 80cc or less are also available.) With adapters it will accommodate larger numbers of small tubes.

Type SP/X holds ten 50cc and five 15cc tubes. Readily available adapters for smaller tubes provide utmost versatility.

Write for Bulletin VM 31

Ivan Sorvall, inc.

210 FIFTH AVENUE, NEW YORK 10, N. Y.

The magic whispers...

When Grandpa tucked you between his knees, you knew you were going to listen again to his wonderful watch—to hear its magic tick . . . tick . . . tick . . .

And as you listened, those measured whispers of time shut away the world, leaving you close to Grandpa, secure in his love.

From fathers and mothers to sons and daughters passes the lifeblood of happiness—security. The privilege of providing it for those we love can be found only in a land like ours.

And another wonderful thing is this: By realizing this privilege of freedom for ourselves, we achieve the security of our country. For, think—the strength of America is simply the strength of one secure home touching that of another.

Saving for security is easy! Here's a savings system that really works—the Payroll Savings Plan for investing in United States Savings Bonds.

This is all you do. Go to your company's pay office, choose the amount you want to save—a couple of dollars a payday, or as much as you wish. That money will be set aside for you before you even draw your pay. And automatically invested in Series E Savings Bonds which are turned over to you.

If you can save only $3.75 a week on the Plan, in 9 years and 8 months you will have $2,137.30. For your sake and your family's, too, how about signing up today?

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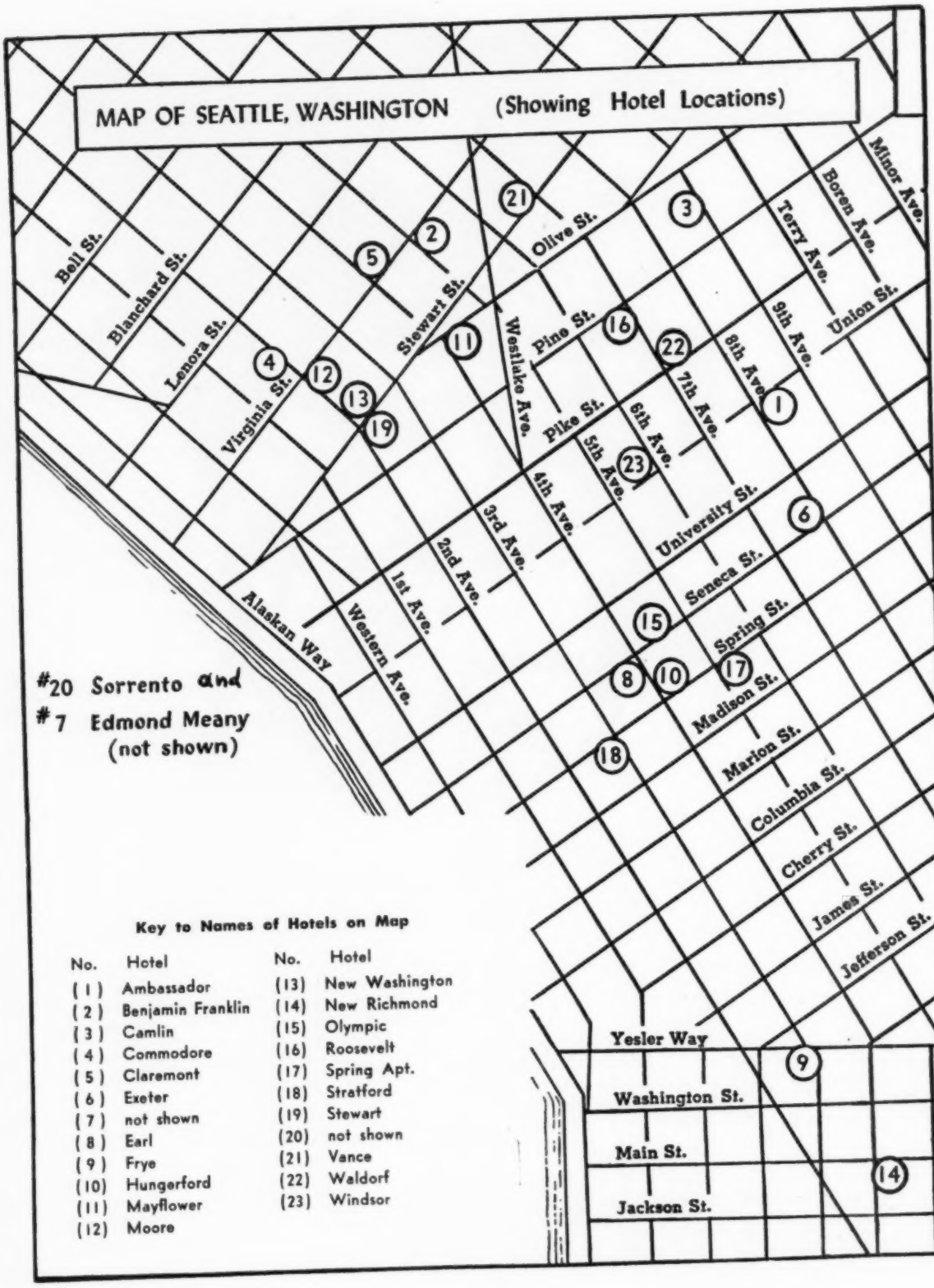


Key to Names of Hotels on Map

No.	Hotel	No.	Hotel
(1)	Ambassador	(13)	New Washington
(2)	Benjamin Franklin	(14)	New Richmond
(3)	Camlin	(15)	Olympic
(4)	Commodore	(16)	Roosevelt
(5)	Claremont	(17)	Spring Apt.
(6)	Exeter	(18)	Stratford
(7)	not shown	(19)	Stewart
(8)	Earl	(20)	not shown
(9)	Frye	(21)	Vance
(10)	Hungerford	(22)	Waldorf
(11)	Mayflower	(23)	Windsor
(12)	Moore		

HOTEL RESERVATIONS — SEATTLE CONVENTION

Ninety-First Annual AVMA Meeting, Aug. 23-26, 1954

All requests for hotel accommodations will be handled by a Housing Bureau in cooperation with the Committee on Local Arrangements. The Bureau will clear all requests and confirm reservations.

HOTELS AND RATES

HOTEL	SINGLE	DOUBLE	TWIN BEDS
1. Ambassador	$5.00	$6.00	———
2. Benjamin Franklin	$7.00	$10.00-11.00	$11.00-15.00
3. Camlin	$7.50	$10.00	$12.00
4. Commodore	$4.50	$6.00	———
5. Claremont	$4.50	$5.50-10.00	———
6. Exeter	$5.50	$7.50	$9.00
7. Edmond Meany	$6.00	$8.00-9.50	———
8. Earl	$4.50	$6.00	$7.00
9. Frye	$4.00	$6.00	$7.50
10. Hungerford	$5.00-6.00	$7.00-9.00	———
11. Mayflower	$7.00	$10.00-11.00	$12.00-14.00
12. Moore	$5.00	$7.00	$8.00
13. New Washington	$5.50-12.00	$8.50-14.00	$9.50-16.00
14. New Richmond	$3.50-4.00	$5.00-5.50	$6.50
15. Olympic	$6.00-15.00	$8.00-15.00	$9.50-15.00
16. Roosevelt	$6.00	$8.00	$10.00
17. Spring Apt.	$5.00	$7.00	$8.00-9.00
18. Stratford	$5.00	$7.00	———
19. Stewart	$5.50-7.50	$6.50-8.50	$9.50
20. Sorrento	———	———	$6.00-8.00
21. Vance	$5.75	$5.50-6.75-7.50	$7.50-8.00
22. Waldorf	$2.50-3.50(*) $5.00	$3.50-5.00(*) $6.50	$7.50
23. Windsor	$6.00	$8.00	$9.00

.....(*) without bath. Tear Here .....

HOTEL RESERVATION FORM — AVMA CONVENTION — SEATTLE

To: Housing Bureau, Seattle Hotel Association,
315 Seneca Street, Seattle, Washington

Date .....

Please make reservations indicated below:

(Three Choices MUST Be Shown)

First choice hotel .....

Second choice hotel .....

Third choice hotel .....

Accommodations and Rates Per Day Desired:

- ☐ Single room at $.....
- ☐ Double-bed room at $.....
- ☐ Twin-bed room at $.....
- ☐ Suite* at $.....

(*) Those desiring suites should clearly specify type of accommodations wanted.

Arriving on (date) .....at.....a.m.....p.m.

Leaving on (date) .....at.....a.m.....p.m.

Room will be occupied by (attach list of additional names if necessary).

Name .....City and State or Province .....

Name .....City and State or Province .....

Your Name (Print or Type) .....

Street Address .....City and State or Province .....

instruments, furniture, etc. Address "Box V 2," c/o JOURNAL of the AVMA.

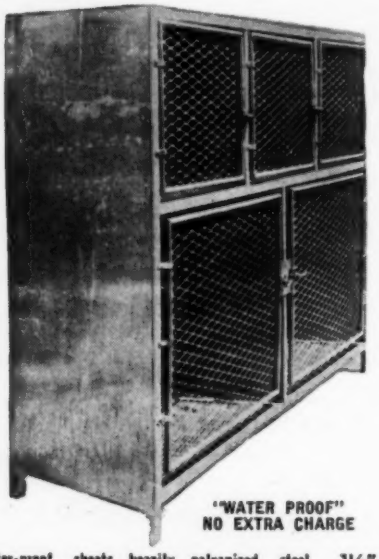
Small animal hospital for sale; profitable, established practice. Landscaped, fine house, commuting distance from New York City, on main highway in Fairfield County, Connecticut. Please state experience in practice and amount of capital available for purchase on terms. Address "Box V 3," c/o JOURNAL of the AVMA.

Well-established, lucrative practice for sale in Wisconsin. Real estate, drugs, office and hospital equipment. Priced to sell at $19,000. Address "Box V 4," c/o JOURNAL of the AVMA.

Small animal hospital 60 miles from New York City with adjoining 8-room home for sale or for lease with option to buy. New York license necessary. Address "Box V 5," c/o JOURNAL of the AVMA.

For sale, or lease with option to buy, mixed practice, hospital, and equipment; large animals, 75%, small animals 25%; established 38 years. Address Dr. D. S. Sisk, Mansfield, Ill.

5 COMPARTMENT KENNELS
$169.50



"WATER PROOF"
NO EXTRA CHARGE

Water-proof, sheets heavily galvanized, steel. 1½" angle steel welded frames. Doors—9 ga. 1½" steel mesh with steel angle frame. Assembled complete. 5' 6" high. 6 ft. long, 6 in. off ground. Painted. Serving leading Universities.

Compare before you buy and you will agree that our kennel is excellently constructed, more costlier materials used, cheaper in price and you actually save from $25.00 to $75.00 for the same kennel constructed elsewhere. All floors are flush for easy cleaning. Over 3,000 satisfied customers. Heavy duty casters, $12.50 extra. Sorry, no C.O.D.'s. Send check or M.O.

Write For Free 16-Page Catalog.

DEE-CHICAGO MFG. CO
Mfrs. of Dog Cratis, Equipt. & Supplies Since 1912
7000 S. Campbell Ave., RE 7-3111, Chicago 29, Ill.

Small animal hospital near Los Angeles, for sale. No real estate; 40-animal capacity. Gross $26,000; $12,500 cash or $13,500 terms with $5,000 minimum down. Address "Box W 17," c/o JOURNAL of the AVMA.

A golden opportunity for veterinarian who wishes to semi-retire in California. New home with small hospital for sale and a good net with little work. Terms. Address "Box M 16," c/o JOURNAL of the AVMA.

Established mixed practice for sale in Southern California; includes new brick home with small animal clinic. Down payment, $10,000; balance monthly at 6% interest. Total price, $29,500. Address "Box M 17," c/o JOURNAL of the AVMA.

Excellent small animal practice for sale in southern California. No real estate. Full price of $14,000 includes drugs and equipment; grossing over $18,000. Address "Box V 16," c/o JOURNAL of the AVMA.

Mixed practice for sale in western Montana; modern 13-room small animal hospital, large animal corrals, stable, and stocks. Yearly gross with two men over $30,000; price, $35,000, actual appraisal of building. Address "Box V 30," c/o JOURNAL of the AVMA.

(*Continued on p. 54*)

This picture entitled "You surely remember us, Doctor—breech presentation?" is reprinted from the "Ethicon Infirmary" a humorous booklet which ascribes to cats and dogs some of our conceits and prejudices and other human weaknesses. The booklet is available to the veterinary profession by writing to the Ethicon Suture Laboratories, New Brunswick, N. J.

Here's why

CBL

THE VETERINARIANS' INSTITUTION

protects you when it appears on your biologics and pharmaceuticals

Illustrated are two of the many products of Affiliated Laboratories Corporation.

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Corn Belt is a co-owner and co-operator of Affiliated, one of America's newest and most modern laboratories for the production of Veterinary biologics.

When the CBL insignia appears in connection with any biologic or pharmaceutical, the graduate veterinarian is assured that it is both laboratory and field tested, and standardized, safe and dependable—a product produced for your profession.

Corn Belt Laboratories, through its home office and laboratories and its conveniently located branch depots, makes it a cardinal principal to provide unexcelled service to the veterinarian, at producers' most favorable prices. Directed by graduate Veterinarians, CBL knows the exacting demands of the profession and can always be depended on for its professional knowledge, experience, resources and willingness to meet them.

For these reasons it is good practice to rely on CORN BELT for your needs . . . to "turn first to CORN BELT."

The Veterinarians' Institution

CORN BELT Laboratories Inc.

EAST ST. LOUIS, ILLINOIS

Since 1913

Lucrative large animal practice for sale in Northeast. Equipment and buildings worth more than asking price of $20,000. Year's net close to $15,000. Address "Box V 20," c/o JOURNAL of the AVMA.

Small animal practice, including equipped modern hospital, for sale in North Carolina. Small down payment; terms arranged. Address "Box V 23," c/o JOURNAL of the AVMA.

Small animal practice for sale in Connecticut. Large animal work can be developed. Good location. Opportunity for young veterinarian. Address "Box V 25," c/o JOURNAL of the AVMA.

BROKEN TEETH

—repaired in bottom clipper blades. Top and bottom blades sharpened to match. Save money—Guaranteed.

Prices on Request

HIGHLY SPECIALIZED SHARPENING

Sales—Repairing on Oster and Stewart clippers.

Sharpened Blades Tested on Rabbit Fur

OSTER A-2 $.75 STEWART $1.00

Prompt Service—Est. 17 years

MAIL TO NEWFOUNDLAND 9-3412

CLIPPER SERVICE OAK RIDGE NEW JERSEY

For sale in suburban Philadelphia, 30-cage, fully equipped small animal hospital on main highway. Valuable real estate. Two 4-room apartments, 4-car garage easily convertible to kennel building. Parking facilities. Gross, $15,000 plus; price, $40,000, one-half in cash necessary. Address "Box V 22," c/o JOURNAL of the AVMA.

Wanted to Buy

Want to buy veterinarian's complete two-way radio outfit in good working order. Prefer Motorola but would consider G.E. State particulars and price. Address "Box V 8," c/o JOURNAL of the AVMA.

Wanted — Large animal operation table. Please state price and condition in reply. Kewanee Veterinary Hospital, 217 W. Division St., Kewanee, Ill.

Miscellaneous

Keeping up on dogs, breeds, shows, etc. *Dog World,* monthly, $3, 1 yr; $5, 2 yr; $10, 5 yr. For dog books, Kennel blanks, write us. Judy Publishing Co., 3323 Michigan Blvd., Chicago 16, Ill.

Pregnancy Diagnosis—in mare from 45th to 150th day. Write for vials and mailing tubes. Price: $7.00; 2 or more tests, $6.00 each. Pregnancy Diagnostic Laboratories, H. S. Lames, D.V.M., Dysart, Iowa.

(*Continued on p. 58*)

NEW IMPROVED RANCH RECORD VETERINARY SYRINGE

The Ranch Syringe was improved lately with a new two piece top cap. The plunger can be removed for sterilization without removing the glass barrel from the metal frame. This improvement makes it easier to sterilize and eliminates breakage. Smooth operation and accurate dosage is assured at all times.

The Ranch Syringe is made with finger bars or three rings.

Inquire at your nearest veterinary dealer or wholesaler about this new improved outstanding product.

Sizes 2cc. to 40cc.

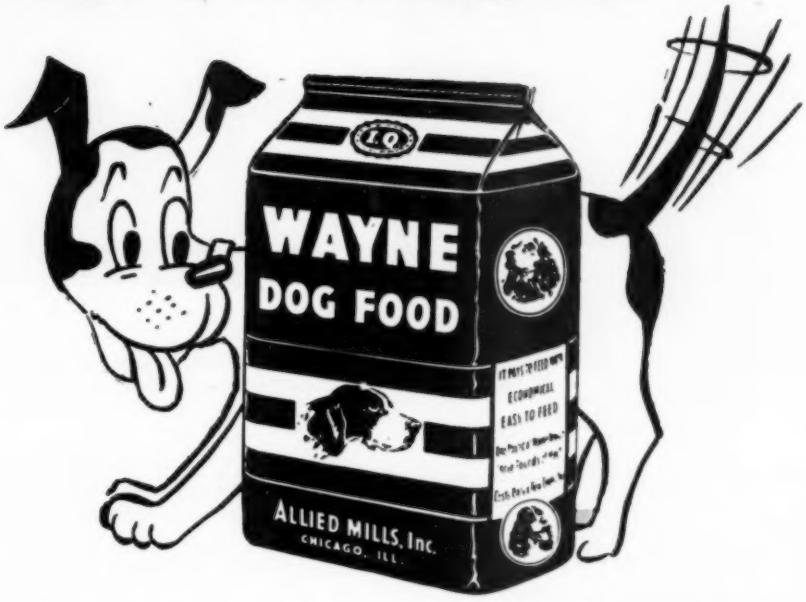
Literature Upon Request

Boston Instrument Mfg. Co. Inc.,

50 Thayer St., Boston 18, Mass.

IT'S A REAL

'TAIL WAGGER'



Here's a quality dog food Veterinarians can feed and recommend with full confidence. It's outstanding because:

- Contains Vitamin B-12 and Antibiotics for Fast Growth and Top Dog Nutrition.
- Dogs Go For Amazing New "Sniff" Factor With Extra Taste and Nose Appeal.
- Contains Extra B-Complex Vitamins For Keen Condition, Better Coats, Brighter Eyes, More Stamina.
- Fat Stepped Up To 7% For More Energy, Higher Palatability, and Feeding Economy.
- Abundantly Supplies Animal Protein through High Levels of Meat and Liver Meal.

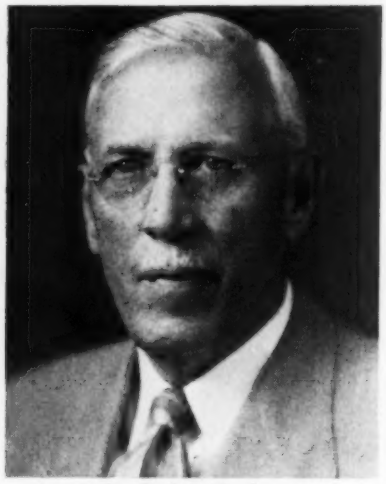
FEED IT — THEN RECOMMEND IT!

WAYNE DOG FOOD

Allied Mills, Inc., Kennel Food Division, Fort Wayne 1, Indiana

New Officers of Norden Laboratories

Dr. Carl J. Norden has resigned as president of Norden Laboratories, after serving thirty-five years in that office. He will remain active as chairman



Dr. Carl J. Norden

of the board. A graduate of the Kansas City Veterinary College in 1911, he founded Norden Laboratories in 1919. Dr. Norden has been closely identified with the veterinary profession and has served as president of the Missouri Valley V.M.A. and as secretary and president of the Nebraska State V.M.A.

Dr. E. C. Jones

Dr. E. C. Jones (KSC '16), vice-president and sales manager for twenty years, now becomes the new president. He was president of the Platte Valley Serum Company until its merger with Norden in 1934. Dr. Jones has served as president and director of the Associated Serum Producers.

Dr. Carl J. Norden, Jr.

Dr. Carl J. Norden, Jr. (ISC '43), who literally grew up in Norden Laboratories, has been elected vice-president and secretary.

Mr. Lewis E. Harris has been elected to the board of directors and will continue as director of pharmaceutical research.

NOW available! Metal covered cases for your serums and instruments!

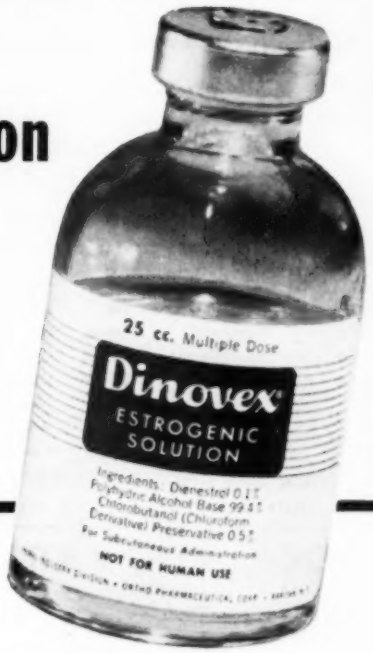
Our steel-sheathed cases for serums and instruments are really built to take the beating they get bumping around from farm to farm. Walls are made of heavy plywood, then covered with sheet steel. Black enamel finish is baked on. Corners heavily reinforced. Trim, latches, corner braces of solid brass.

Available in five standard styles ranging from $10.35 to $13.25 each, FOB Denver. Water-resistant lining, $1.75 extra per case. Write for full details on stock cases and custom built cases designed to your specifications.

NICHOLSON
Manufacturing, Inc.
Box 7115,
Denver 6, Colorado

NICHOLSON
precision veterinary equipment

An estrogenic solution for non-settling cows and mares



Dinovex®

In 5 cc. vials...also 25 cc. multiple dose bottles

FOR ESTROGEN-DURING-ESTRUS THERAPY—Dinovex is an estrogenic preparation for the treatment of functional sterility in cows and mares, which come into heat but fail to settle because of insufficient production of estrogen.

Dinovex supplements the ovarian estrogen production during estrus. It provides the necessary stimulation to the maturing follicle to proceed toward ovulation and corpus luteum formation.

SHORTENS MARE'S HEAT PERIOD—In brood mares, Dinovex shortens the duration of the heat period to 2 to 4 days. With Dinovex, only one or two services per heat period are required—and these are more effective, because they are "timed" to ovulation. This results in a higher rate of conception, and greater utilization of the stallion.

PROVED HIGHLY EFFECTIVE—Because Dinovex has proved highly effective in treatment of breeding inefficiencies of thousands of cows and mares, we are suggesting to dairymen and horse breeders, through advertising, that they ask you about this estrogenic solution as a possible aid to higher conception.

SUPPLIED—Available only to veterinarians, Dinovex is supplied in 5 cc. single dose vials, and 25 cc. multiple dose economy bottles. Order from your veterinary supply house.

LITERATURE—For literature giving full information on the use of Dinovex, address Dept. JA-3.

ORTHO PHARMACEUTICAL CORPORATION
Animal Industry Division, Raritan, New Jersey

■ *Established Inbred Strains*

■ *Low Incidence of Salmonella*

■ *Constant "normal" Antibiotic-Free Diets*

are but a few of the

FIXED FACTORS

which contribute toward precise mass production of

ROCKLAND	(all purpose)	RAP	albino	MICE
SWISS	(Webster)	SW	albino	
d/b/a	(original)	DBAL	leaden	
d/b/a	(substrain)	DBAT	tan	
d/b/a	(substrain)	DBAW	white	
C-57	(original)	C-57	black	
C-57	(substrain)	C-57	brown	
C3H	(original)	C3H	agouti	

assuring UNIFORM RESULTS in routine or exploratory studies

ROCKLAND FARMS

(formulators of Rockland Stock diets and breeders of research animals SINCE 1921)

New City (Rockland County) New York

price list on request

Bovine and Equine

Safety

MOUTH SPECULUM

- Safety locking feature withstands 800 lbs pressure.
- Allows adequate room for inserting arm from either side.
- Attachment available for passing stomach tube through mouth makes this operation simpler and more humane.

Price $57.50 POST PAID For stomach tube attachment add $15

Sold to veterinarians only by makers of famous MacAllan Ear-Cropping Forms. Send check or money order, or phone Lansing 2-3797.

MacALLAN LABORATORIES

Route No. 2, Box 420 Lansing, Michigan

(CLASSIFIED ADS—*continued from p. 54*)

Clipper Blade Sharpening

Have your clipper blades sharpened by an expert with 28 years of practical factory training. We know how your blades must be ground to cut like new. Also clipper repairing. All work guaranteed to satisfy you or money back. Now serving veterinary colleges, and over 500 satisfied veterinarians. Why not you? 24-hour service. We ship insured prepaid. Avoid C.O.D. charges; enclose 75 cents for each set with blades. We are headquarters for Oster and Stewart clippers and blades. Complete clipping supplies; upper and lower replacements. Write for information on Oster and Stewart quality clippers and products. Service Grinding and Supply Co., 903 Chicago St., Racine, Wis.

Sound film entitled "Your Veterinarian"; 16 mm., 15-minute color. Nontechnical film for lay audience; a day behind the scenes of a typical hospital for small animals. Rental, $25. Please try to order film at least one month in advance for showing. Address Henry Charles, motion pictures, Stelton, N.J.

Bovine Prolapse Preventer—Payton Utero-Vaginal Prolapse Preventer. Quickly, easily applied to any size cow. Aluminum, reusable, nonirritating, sanitary.

(*Continued on p. 62*)

What makes cancer MAN'S CRUELEST ENEMY?

SOME diseases kill us mercifully.

NOT CANCER. Yet, if nothing is done, 23 million living Americans are destined to die of cancer . . . 230,000 of them *this year*.

SOME diseases reveal their beginnings by pain or fever or shock. Not cancer. It starts silently, secretly, and too often spreads rapidly.

AND SOME diseases spare us our young people. Not cancer! It strikes men and women and children, the old and the young. If nothing is done, one American in five will be stricken with cancer.

SOMETHING CAN BE DONE. You can strike back at this cruel killer with a really generous gift to the American Cancer Society. Your money is *urgently* needed—for research, for education, for clinics and facilities. Please make it a really BIG gift!

Cancer
MAN'S CRUELEST ENEMY
Strike back—Give
AMERICAN CANCER SOCIETY

WHAT'S HIS *Preference?*

When you come right down to it, dogs, themselves, play a major role in making Gaines the largest-selling dog meal in America! Dogs really *show* their taste preference for Gaines.

All ingredients of Homogenized* Gaines are combined into crunchy, appetizing little granules. And unlike ordinary meals, Gaines never gets flaky or pasty—doesn't pack down in the dish. In fact, Gaines Meal is so appealing in texture, aroma and taste that many dogs enjoy eating this food dry. That makes Gaines easy to feed, excellent for time-saving self-feeding methods.

Most important is the fact that Gaines Meal provides balanced amounts of every food essential dogs are known to need. This complete nourishment is in every package, every mouthful, every granule of Gaines.

Veterinarians, breeders, sportsmen and pet owners have clearly shown *their* brand preference by keeping Gaines Meal in first place among all dog meals. Obviously, they believe in selecting a health-protecting dog food! **Don't you?**

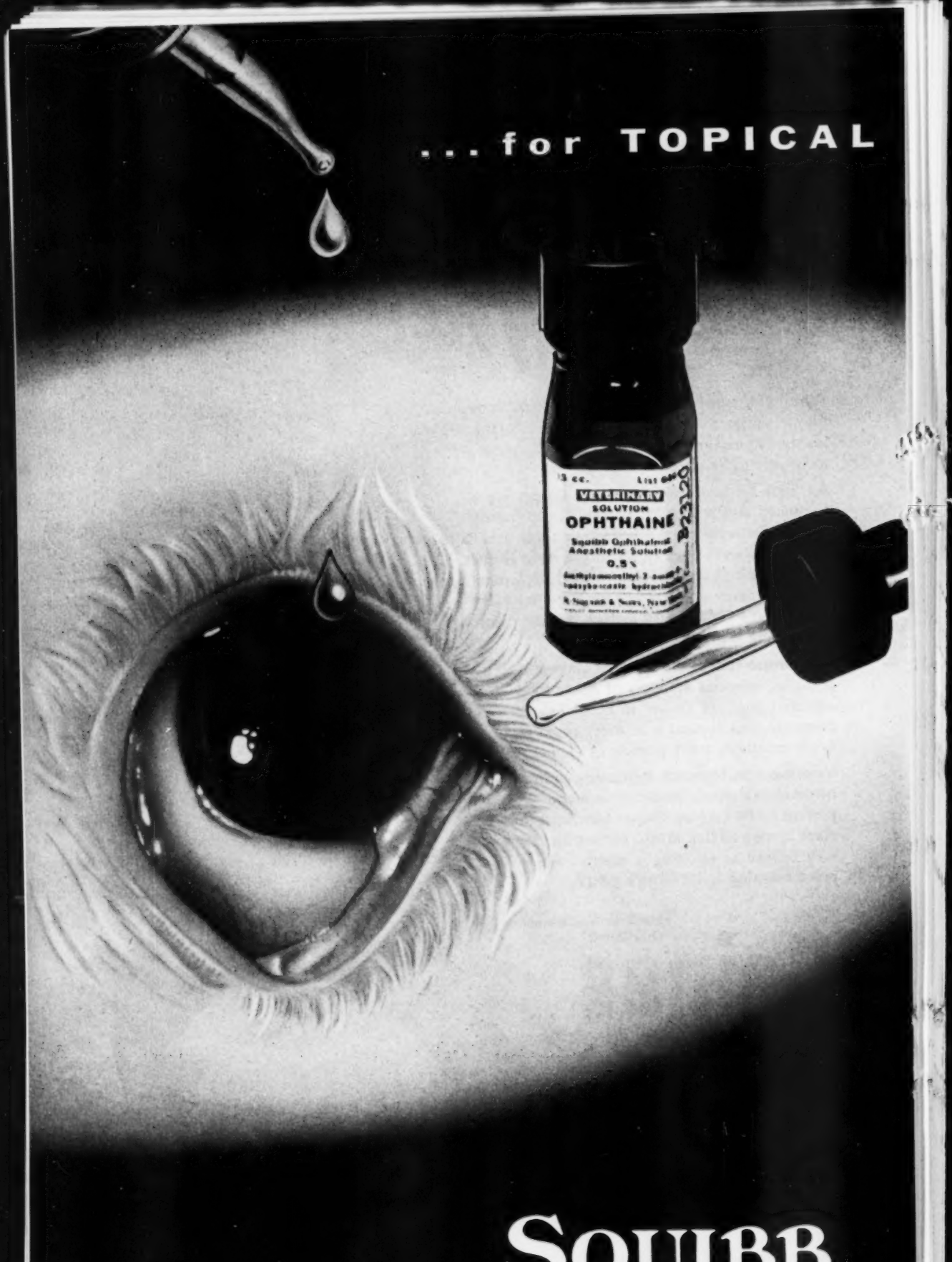
**Uniform Nourishment Guaranteed*

Gaines

America's Largest-Selling Dog Meal

NOW HOMOGENIZED!

A Product of General Foods


. . . for TOPICAL
VETERINARY
SOLUTION
OPHTHAINE
Squibb Ophthalmic
Anesthetic Solution
0.5%
SQUIBB

OPHTHALMIC ANESTHESIA

OPHTHAINE*

veterinary

SQUIBB

new! **safe, efficient, non-irritating**

Solution Ophthaine Veterinary instilled into the eye produces local anesthesia in a quick, efficient manner.

In addition, it has been shown to be virtually free of undesirable side effects. It is non-irritating to conjunctival membranes.

Ophthaine is a sterile aqueous solution containing 0.5 percent of the active ingredient, 2-diethylaminoethyl-3-amino-4-propoxybenzoate hydrochloride.

Supplied in 15 cc. dropper bottles. Available from your veterinary supply house. For further information, address: E. R. Squibb & Sons, *Division of Mathieson Chemical Corporation,* Dept. JA-3, 745 Fifth Avenue, New York 22, N. Y.

*OPHTHAINE is a trademark.

A NAME YOU CAN TRUST

Noninterference with placenta release. Excellent for vaginal protrusion; dispensing. *See* article JOURNAL of the AVMA, December, 1951. Only $3.00; two for $5.00. Prepaid. Dr. Jerome Payton, Morris, N.Y.

Rare collectors' item for sale. A copy of Markham's Masterpiece, a book on veterinary medicine published in London in 1675. Address Mary Nelson, Box WW, Palm Springs, Calif.

Artificial insemination instruments. Disposable obstetrical sleeves 20 cents each. Package of 20 including detachable chest band—$5, postpaid. Samples and complete catalog on request. Breeders Equipment Co., Flourtown, Pa.

Since 1918 CURTS

Pharmaceutical Manufacturers to the Veterinary Profession

CURTS LABORATORIES

Formerly Curts-Folse Laboratories

73 Central Ave. Kansas City, Kansas

Received Too Late to Classify

Veterinarian wanted for a three-man mixed practice in the Middlewest. Good salary and commission for steady, reliable man. If experienced, give details. Address "Box V 27," c/o JOURNAL of the AVMA.

Veterinarian wanted with Missouri license for staff of established small animal hospital. Start, $6,000. Give full details as to age, marital status, schools attended, experience, et cetera. Address "Box V 28," c/o JOURNAL of the AVMA.

European veterinarian, three years of experience in small animal practice, desires position as assistant in small animal hospital. Prefer New York City, Chicago, Buffalo, Detroit, or Philadelphia. Can speak English fairly well, but would like to learn more of the language and more of the small animal practice. Licensed and accredited in Ohio and Indiana. Address "Box S 22," c/o JOURNAL of the AVMA.

(*Continued on p. 63*)

Send for FREE 36-page Treatise on
CARROT OIL VITAMINS

Details the advantages of carrot oil vitamins when used in feeds to improve breeding results; to destroy oxidized milk flavors; and to promote general good health and glossy coats. Contains much information. Replete with data and references. Send for it today
NUTRITIONAL RESEARCH ASSOCIATES
Dept. 251-M. South Whitley, Indiana

Just Right!

The Most Complete Service Depot in the Southeast for Serums, Pharmaceuticals, Biologicals, Hog Cholera Vaccines, Laboratory Equipment, Instruments and all the Leading Specialties. . .

Complete Supplies for Graduate Veterinarians

WIRE, CALL OR WRITE YOUR NEXT ORDER TO

ALBANY

For Dependable Service

THE ALBANY SERUM COMPANY
"Complete Veterinary Supplies"
3rd AND FRONT STS. ALBANY, GEORGIA

(CLASSIFIED ADS—*continued from p. 62*)

Desire permanent position in Ohio or Indiana with small animal or mixed practitioner. Five years of experience in small animal practice. Licensed in Ohio. Address "Box V 29," c/o JOURNAL of the AVMA.

Veterinarian desires position with progressive general practitioner in Southeast leading to partnership. Graduate of AVMA-approved school, six years' experience in general practice. Have some capital, age 29, married. Address "Box V 30," c/o JOURNAL of the AVMA.

Assistantship wanted for Austrian veterinarian, 1952 graduate. Main experience with large animals. Presently with U. S. Army, Vienna, Austria. Salary no object. Write Lt. Dallas Tuthill, 110th Station Hospital, APO 777, c/o Postmaster, New York, N.Y.

Mixed practice for sale in Massachusetts city of 100,000. Gross, $20,000; price, $24,000, equipment extra. New modern hospital, new 6-room home on 3-acre corner, main route. Address "Box V 26," c/o JOURNAL of the AVMA.

Veterinarian wanted to assist in small animal practice, East Central United States. Excellent living quarters on premises but not in hospital. Address "Box V 31," c/o JOURNAL of the AVMA.

Position wanted in a small animal hospital by a senior student of accredited school. Has previous M. Sc. and some experience during two summers in small animal practices. References; age thirty, married, no family. Addresss "Box V 32," c/o JOURNAL of the AVMA.

CATS and kittens

Train themselves naturally

with KITTY LITTER

— a specially processed material which takes the place of messy sand and requires less frequent replacement.

ABSORBS
DEODORIZES

It is clean, sanitary, disposable . . . easy to use, economical . . . harmless to pets. A 5-lb. package lasts several weeks. Sold and used by leading veterinarians and cat owners everywhere.

ASK FOR NAME OF NEAREST JOBBER.

Free Literature on Request

LOWE & LOWE COMPANY

Dept. 310 **Cassopolis, Mich.**

For TEAT PROBLEMS IN YOUR PRACTICE

SULFA impregnated—
surgical dressings for the Teat Canal

To maintain unrestricted milk flow and provide antiseptic protection are of first importance in the care of injured teats, scab teats, and in post operative therapy.

Dr. Naylor Dilators act as an internal bandage to the teat canal. They provide gentle, non-irritating support and broad spectrum germicidal activity to injured teat mucosa. They promote normal tissue repair with a minimum of altered milking function of the streak canal.

STERILIZED — MEDICATED

Dr. Naylor Dilators are sterilized and medicated prior to packaging. The medication is IN the Dilators and is released slowly to maintain a prolonged antiseptic level.

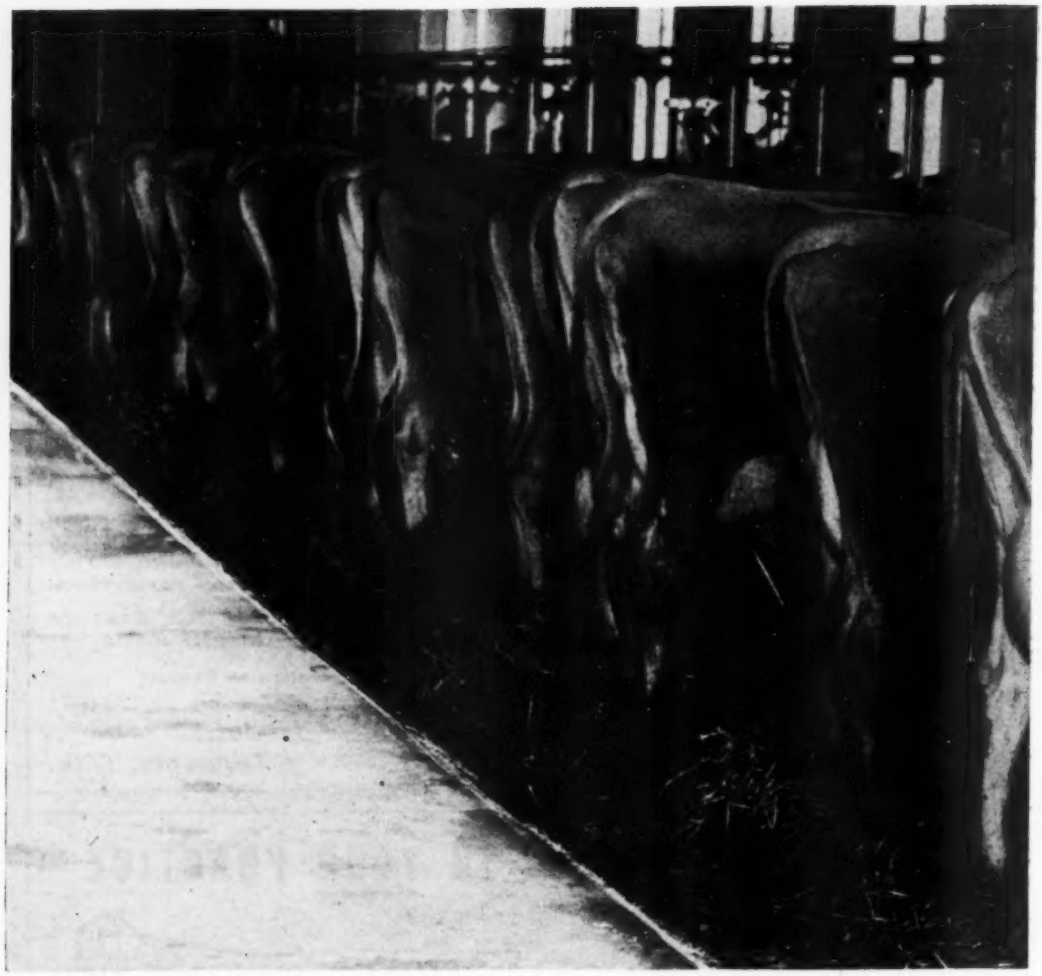
Dr. Naylor Dilators are soft, supportive surgical dressings impregnated with Sulfathiazole and Methyl Violet. Fit either large or small teats. Smooth, rounded tip for easy insertion.

Dr. Naylor's

MEDICATED TEAT DILATORS

DISPENSING PACKAGE (Contains 12 Dilators) 3.00 per doz. →

H. W. NAYLOR CO., Manufacturing Chemists, MORRIS, N.Y.



Why hesitate in cases of

digestive dysfunctions in farm animals • • •

EMBLO POWDER or TABOLES

WILL GO RIGHT TO WORK

The administration of milk of magnesia for treating the common digestive dysfunctions of ruminants is made practical and economical by the use of Emblo Powder or Taboles. Each 12 oz. bottle represents the same formula contained in 1 gallon of milk of magnesia plus dibasic sodium phosphate which acts synergistically . . . for use in toxic cases of gastritis in cattle particularly when the offending ingesta is green corn, alfalfa, pea hay, etc.

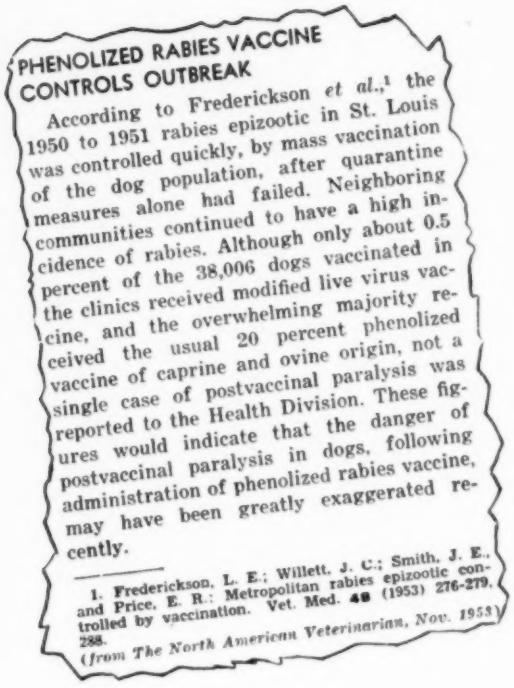
Emblo Powder ..... **12 oz. bottle** **Emblo Taboles** ..... **Pkg. 50**
12-12 oz. cartons

HAVER-GLOVER LABORATORIES

KANSAS CITY, MO.

RABIES VACCINE

(Lockhart)



PHENOLIZED RABIES VACCINE CONTROLS OUTBREAK

According to Frederickson *et al.*,[1] the 1950 to 1951 rabies epizootic in St. Louis was controlled quickly, by mass vaccination of the dog population, after quarantine measures alone had failed. Neighboring communities continued to have a high incidence of rabies. Although only about 0.5 percent of the 38,006 dogs vaccinated in the clinics received modified live virus vaccine, and the overwhelming majority received the usual 20 percent phenolized vaccine of caprine and ovine origin, not a single case of postvaccinal paralysis was reported to the Health Division. These figures would indicate that the danger of postvaccinal paralysis in dogs, following administration of phenolized rabies vaccine, may have been greatly exaggerated recently.

1. Frederickson, L. E.; Willett, J. C.; Smith, J. E., and Price, E. R.: Metropolitan rabies epizootic controlled by vaccination. Vet. Med. **48** (1953) 276-279, 288.

(from The North American Veterinarian, Nov. 1953)

Experience — The article at left as news is not new. It is timely only because it is human nature to seek the sensational, and overlook tried and time-proven methods. Phenolized rabies vaccine has been used as an efficient control measure for many years.

Efficiency — Immunity developed by phenolized rabies vaccine for a practical period of time, is as good as that from any other rabies vaccine, as reported by the Public Health Service.

Economy — The unit cost of phenolized rabies vaccine is far the lowest of any. It is available in bulk packages and amounts at quantity discount prices.

Emphasis —

Lockhart Rabies Vaccine is *produced by veterinarians — advertised only to veterinarians — sold only to veterinarians* — and never sold at a discount to any agency. It is TRULY

A VETERINARIAN'S PRODUCT

ASHE LOCKHART, INC.

"Producers of Better Biologics for Graduate Veterinarians."

800 Woodswether Road **Kansas City, Missouri**

an open letter to a veterinarian who hasn't yet tried modified live virus hog cholera vaccines

Dear Doctor: For several years, veterinarians have been cautiously testing and evaluating various modified live virus hog cholera vaccines. During this period, Jen-Sal research men were also studying new vaccines—their advantages, disadvantages, and future possibilities.

Now, based on years of conservative, careful evaluation, Jen-Sal is marketing a modified live virus, hog cholera vaccine of porcine origin (to be administered simultaneously with 15 cc. hog cholera serum.) Jen-Sal feels that this product is the safest most logical successor to time-tested serum-virus immunization.

This new vaccine is named SV-2 for SIMULTANEOUS VIRUS METHOD No. 2. It is a proven immunological advancement—giving durable immunity without post-vaccination virus flare-ups.

SV-2 (Jen-Sal) is now available in 5, 10, and 50 dose packages. We recommend it to you with confidence. A new brochure on SV-2 is now ready—write for your copy soon.

Jensen-Salsbery Laboratories, Inc.
Kansas City, Missouri